COMMODORE

PC 1

Technical Manual

10/87

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Commodore Deutschland

Dier
Lau
Krämer

1.
Main Board
Schematic PC 1

Inhalt

1. Main Board
   Schematic PC 1

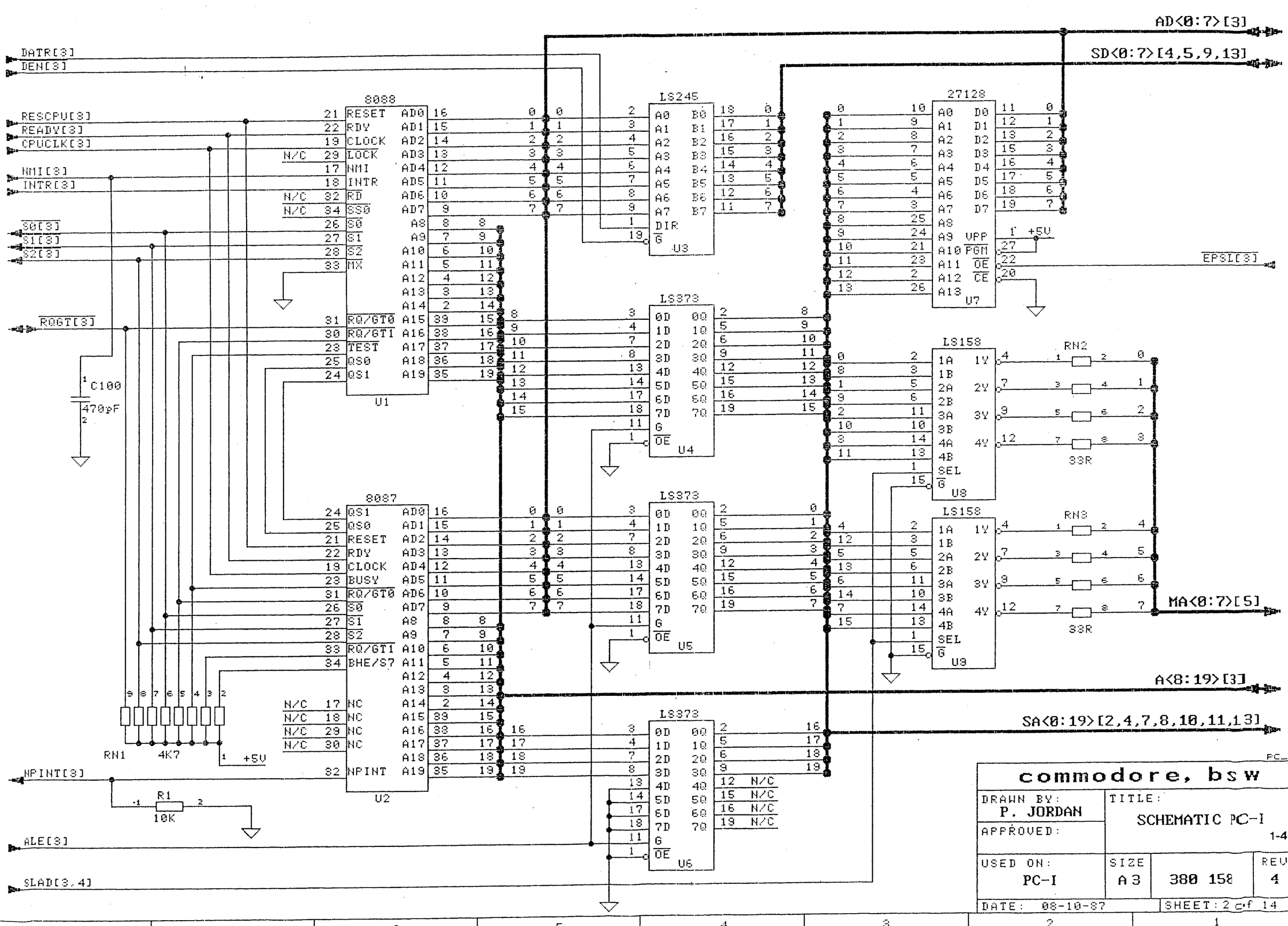
2. Chinon Disk
   Manual

3. Keyboard
   Manual

4. Power Supply
   Schematic

5. Diagnostic

6. Ersatzteil Liste


AD<0:7>[3]
SD<0:7>[4,5,9,13]
DATR[3]
DEN[3]
RESCPU[3]
READY[3]
CPUCLK[3]
NMI[3]
INTR[3]
S0[3]
S1[3]
S2[3]
RQGT[3]
NPINT[3]
ALE[3]
SLAD[3.4]
8088
U1
8087
U2
LS245
U3
LS373
U4
U5
U6
27128
U7
LS158
U8
U9
RN1
4K7
RN2
RN3
33R
R1
10K
C100
470pF
+5V
EPSL[3]
MA<0:7>[5]
A<8:19>[3]
SA<0:19>[2,4,7,8,10,11,13]
commodore, bsw
DRAWN BY: P. JORDAN
APPROVED:
TITLE: SCHEMATIC PC-I
1-4
USED ON: PC-I
SIZE A3
380 158
REV 4
DATE: 08-10-87
SHEET: 2 of 14

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
1	ADVANCED ENGINEERING RELEASE	05-20-87	
2	UPDATE	06-10-87	
3	UPDATE	06-30-87	
4	UPDATE	08-11-87	

DRAWING FILES:	CONTENTS:
PC_1.DWG	THIS SHEET
PC_2.DWG	CPU SECTION
PC_3.DWG	FE2010 SECTION
PC_4.DWG	MIO CHIP, RAM DECODING
PC_5.DWG	640 KB MAIN RAM
PC_6.DWG	FLOPPY INTERFACE
PC_7.DWG	V.24 INTERFACE
PC_8.DWG	PRINTER INTERFACE
PC_9.DWG	VIDEO CONTROL LOGIG I
PC_10.DWG	VIDEO CONTROL LOGIC II
PC_11.DWG	VIDEO RAM
PC_12.DWG	CONNECTORS I
PC_13.DWG	CONNECTORS II
PC_14.DWG	BLOCK CAPS.

PC_1

commodore, bsw

DRAWN BY: H. ULLRICH	TITLE: SCHEMATIC PC-I 1-3		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-11-87	SHEET: 1 of 14		

NOVID[9,10]
MONO[9,10,11]
BRESET[3,8,12]
RS2[3]
RS1[3]
RS0[3]

JS2 1 2

IOCHRDY[3,9,13]
BL[13]
BM[13]
BR[13]
HP[13]
HQ[13]
VP[13]
VQ[13]

9	11	13	10	12	8	28	26	27	29	30	32	31	34	33
RS0	RS1	RS2	WAIT	IOCHRDY	RESET	MONO	NOVID	BUTTON_L	BUTTON_M	BUTTON_R	HP	HQ	VP	VQ

LS00
9
10 U16/3 8
E[9]

SA<0:9>[2,4,7,8,10,11,13]

0	6	A0
1	5	A1
2	4	A2
3	3	A3
4	68	A4
5	67	A5
6	66	A6
7	65	A7
8	64	A8
9	63	A9

MIO

MOS 5720

U14

VSS = 18,19,52
VDD = 1,35

IOR-DLY	57	IORDLY[7]
IOW-DLY	56	IOWDLY[7]
COM-INT	59	COMINT[7]
COM-OUT	58	COMOUT[7]
CS-COM	54	CS-COM[7]
CS-LPT	55	CS-LPT[8]
CS-FDC	51	CS-FDC[6]
CD-LDOR	50	N/C
CS-FDXTR	49	N/C
CS-HDC	48	N/C
CS-RTC	47	N/C
FDC-RES	46	FDC-RES[6]
DRVSEL1	45	DRVSEL1[6]
DRVSEL2	44	DRVSEL2[6]
DRQ2-IN	43	DRQ2-IN[6]
DRQ2	42	DRQ2[3,13]

SAEN[3,10,13]	61	AEN
SIORC[8,13]	62	IOR
SIOWC[8,13]	60	IOW
DACK2[3]	24	DACK2
SCLK[3,13]	7	SCLK
M16[5]	36	M16
SDACK0[3,9,13]	2	DACK0

SD<0:7>
[2,5,9,13]

LS245

0	2	A0	B0	18	0
1	3	A1	B1	17	1
2	4	A2	B2	16	2
3	5	A3	B3	15	3
4	6	A4	B4	14	4
5	7	A5	B5	13	5
6	8	A6	B6	12	6
7	9	A7	B7	11	7
	1	DIR			
	19	G			

U15

14	15	16	17	20	21	22	23	25	53	37	38	39	40	41
D0	D1	D2	D3	D4	D5	D6	D7	IDIR	TEST	IRQ2	IRQ3	IRQ4	IRQ6	IRQ6-IN
0	1	2	3	4	5	6	7			2	3	4	6	

IRQ6-IN[6]
IRQ<2:6>[3,13]

ID<0:7>[6,7,8]

PAL5 (380278-02)

12L6

1)

RS0[3]	1	I1	
RS1[3]	2	I2	
RS2[3]	3	I3	
CAS[3]	4	I4	O1 18
SLAD[2,3]	5	I5	O2 17
SA<16,17>[2,4,7,8,10,11,13] 16	6	I6	O3 16
17	7	I7	O4 15
N/C	8	I8	O5 14
N/C	9	I9	O6 13
N/C	11	I10	
N/C	12	I11	
N/C	19	I12	

U39

RN5

1	2	MRAS0[5]
3	4	MRAS1[5]
5	6	MRAS2[5]
7	8	MRAS3[5]
		MA8[5]
		MCAS[5]

33R

PC_4

NOTE: 1) ASSEMBLED IS EITHER:
PAL5 12L6 (380-278-02)
0R: PAL5 16L8B (380-278-01)

commodore, bsw

DRAWN BY: H. ULLRICH	TITLE: SCHEMATIC PC-I 1-6		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-10-87	SHEET: 4 of 14		

NOTES: 1) ASSEMBLED IS EITHER: Q1,R2,R3,C101 AND FE 2010
OR : OSC1 AND FE 2010A
2) C228 TO C230 ASSEMBLED ONLY IF REQUIRED!

FE 2010/A

U10

A<8:19>[2]

AD<0:7>[2]

IRQ<2:7>[4,8,13]

1)

Q1 14.318MHZ

R2 100R

R3 1M

OSC1 28.636 MHz

C101 47pF

+5V

4K7 RN4

D1 1N4148

RESET-IN[7,12]
IOCHCK[13]
KBCLK[12]
KBDATA[12]
IOCHRDY[4,8,13]
VID0[10]
VID1[10]
NPINT[2]

C307 47uF
C102 470pF
C103 470pF

JU1

DR01[13]
DR02[4,13]
DR03[13]

S0[2]
S1[2]
S2[2]

2)

C228 100pF
C229 100pF
C230 100pF

21	X2	
23	X1	
0	34	AD0
1	35	AD1
2	36	AD2
3	37	AD3
4	38	AD4
5	39	AD5
6	40	AD6
7	41	AD7
	15	RESET
	27	IOCK
	25	KBCLK
	26	KBDATA
	28	IORDY
	12	VID0
	13	VID1
	29	NPINT
N/C	33	PTOUT
	16	PTIN
	32	

8	A8	
9	A9	
10	A10	
11	A11	
12	A12	
13	A13	
14	A14	
15	A15	
16	A16	
17	A17	
18	A18	
19	A19	
6	EPSL	
17	READY	
31	NMI	
24	RQGT	
71	DEN	
72	DTR	
70	ALE	
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		

	DACK0	63
	DACK1	62
	DACK2	61
	DACK3	60
	EOP	59
	OSC	20
	CLK	19
	RESET	18
	A64K	11
	USCS	9 N/C
	AEN	30
	IORC	65
	IOWC	66
	MEMR	67
	MEMW	68
	BIOCS	7 N/C
	BALE	69
	SLA	10

76	IR2	
77	IR3	
78	IR4	
79	IR5	
80	IR6	
81	IR7	
58	DR01	
57	DR02	
56	DR03	
75	S0	
74	S1	
73	S2	
14	SPEAKER	
4	RS3	
0	RS2	
84	RS1	
83	RS0	
82	CAS	
5	RAMS	
8	SLA	

N/C

R4 4K7
R5 1K

+5V

BC327 T1

R6 33R

LS244 U11

2	A0	Y0 18
4	A1	Y1 16
6	A2	Y2 14
8	A3	Y3 12
11	A4	Y4 9
13	A5	Y5 7
15	A6	Y6 5
17	A7	Y7 3
1	1G	
19	2G	

R7 33

LS04 U13/5

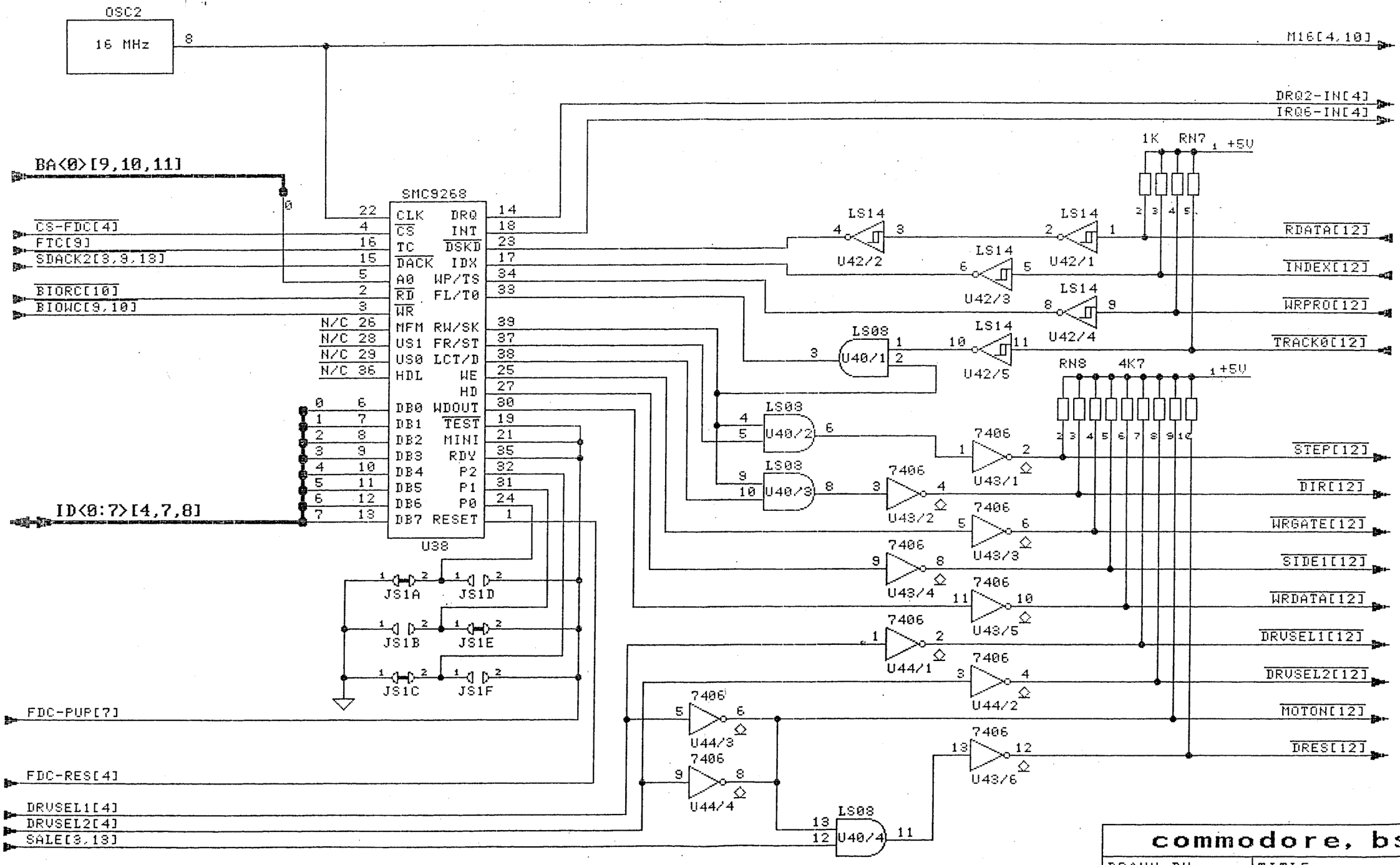
LS244 U12

2	A0	Y0 18
4	A1	Y1 16
6	A2	Y2 14
8	A3	Y3 12
11	A4	Y4 9
13	A5	Y5 7
15	A6	Y6 5
17	A7	Y7 3
1	1G	
19	2G	

EPSL[2]
READY[2]
NMI[2]
IOWC[10]
CPUCLK[2]
RQGT[2]
DEN[2]
DATR[2]
ALE[2]
DACK2[4]
SDACK0[4,9,13]
SDACK1[13]
SDACK2[6,9,13]
SDACK3[13]
TC[9,13]
S14M[10,13]
SCLK[4,13]
BRESET[7]
BRESET[4,8,9,12]
IORC[10]
SAEN[4,10,13]
SIORC[4,8,13]
SIOWC[4,8,13]
SMEMR[13]
SMEMW[13]
MWE[5]
SALE[6,13]
SRESET[13]
RESCPU[2]
MEMR[10]
INTR[2]
SLAD[2,4]
RAMS[5]
CAS[4]
RS0[4]
RS1[4]
RS2[4]
SPKR[12]

PC_3

commodore, bsw			
DRAWN BY: P. JORDAN	TITLE: SCHEMATIC PC-I 1-5		
APPROVED:			
USED ON: PC-I	SIZE A3	.380 150	REV 4
DATE: 10-08-87	SHEET: 3 of 14		



NOTES: 1. JS1A-F SELECT WRITE PRECOMP.

FC_6

commodore, bsw

DRAWN BY: H. ULLRICH	TITLE: SCHEMATIC PC-I 1-8		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 03-10-87	SHEET: 6 of 14		

MA<0:7>[2]

RN6
33R

MA8[4]
N/C
N/C
MWE[3]
MCAS[4]
MRAS0[4]
MRAS1[4]
MRAS2[4]
MRAS3[4]

U17 41256
U18 41256
U19 41256
U20 41256
U21 41256
U22 41256
U23 41256
U24 41256
U25 41256
U26 41256
U27 41256
U28 41256
U29 41256
U30 41256
U31 41256
U32 41256

RA0 RA1 RA2 RA3 RA4 RA5 RA6 RA7 RA8
WE CAS RAS
DI DO

MD<0:7>

U33 41464
U34 41464
U35 41464
U36 41464

RA0 RA1 RA2 RA3 RA4 RA5 RA6 RA7
WE CAS RAS OE
D0 D1 D2 D3
D4 D5 D6 D7

LS245
U37
B0 B1 B2 B3 B4 B5 B6 B7
A0 A1 A2 A3 A4 A5 A6 A7
DIR
G

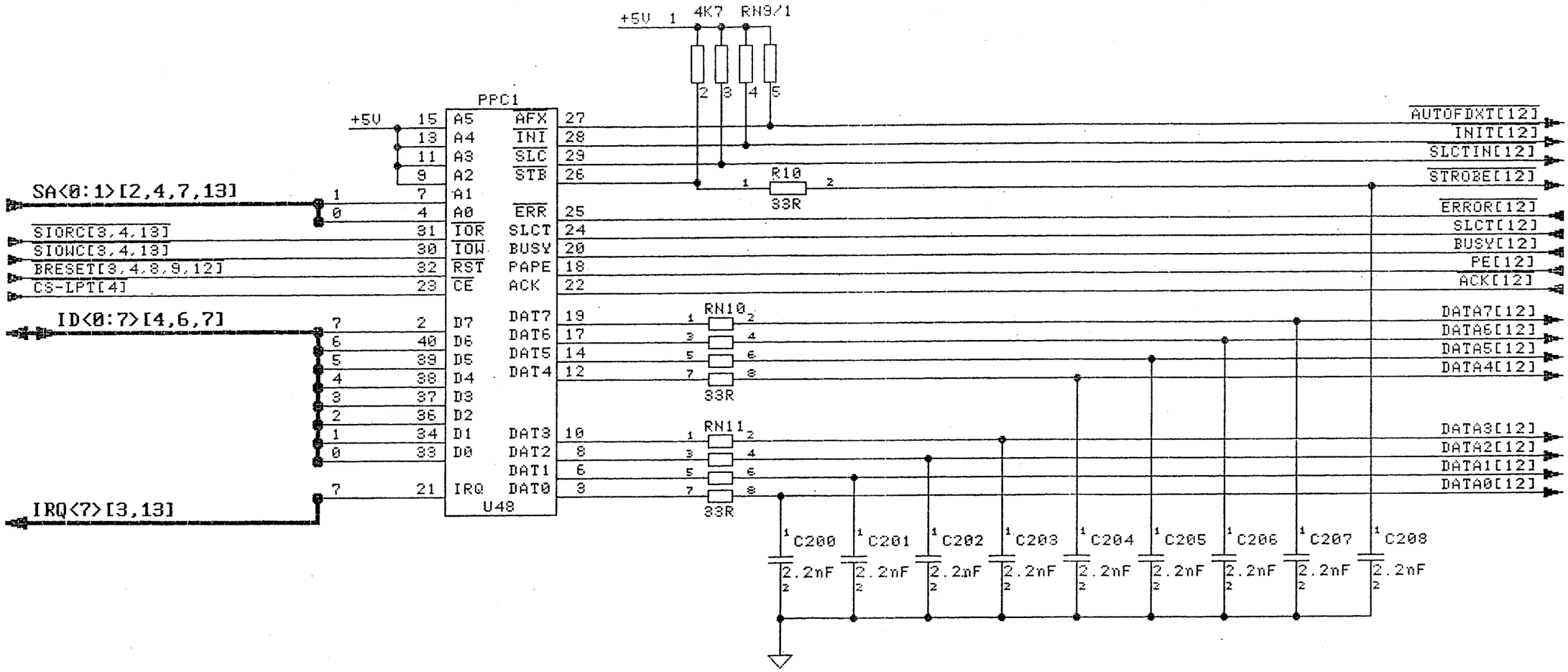
SD<0:7>
[2,4,9,13]

BMEMR[10]
RAMS[3]

PC_5

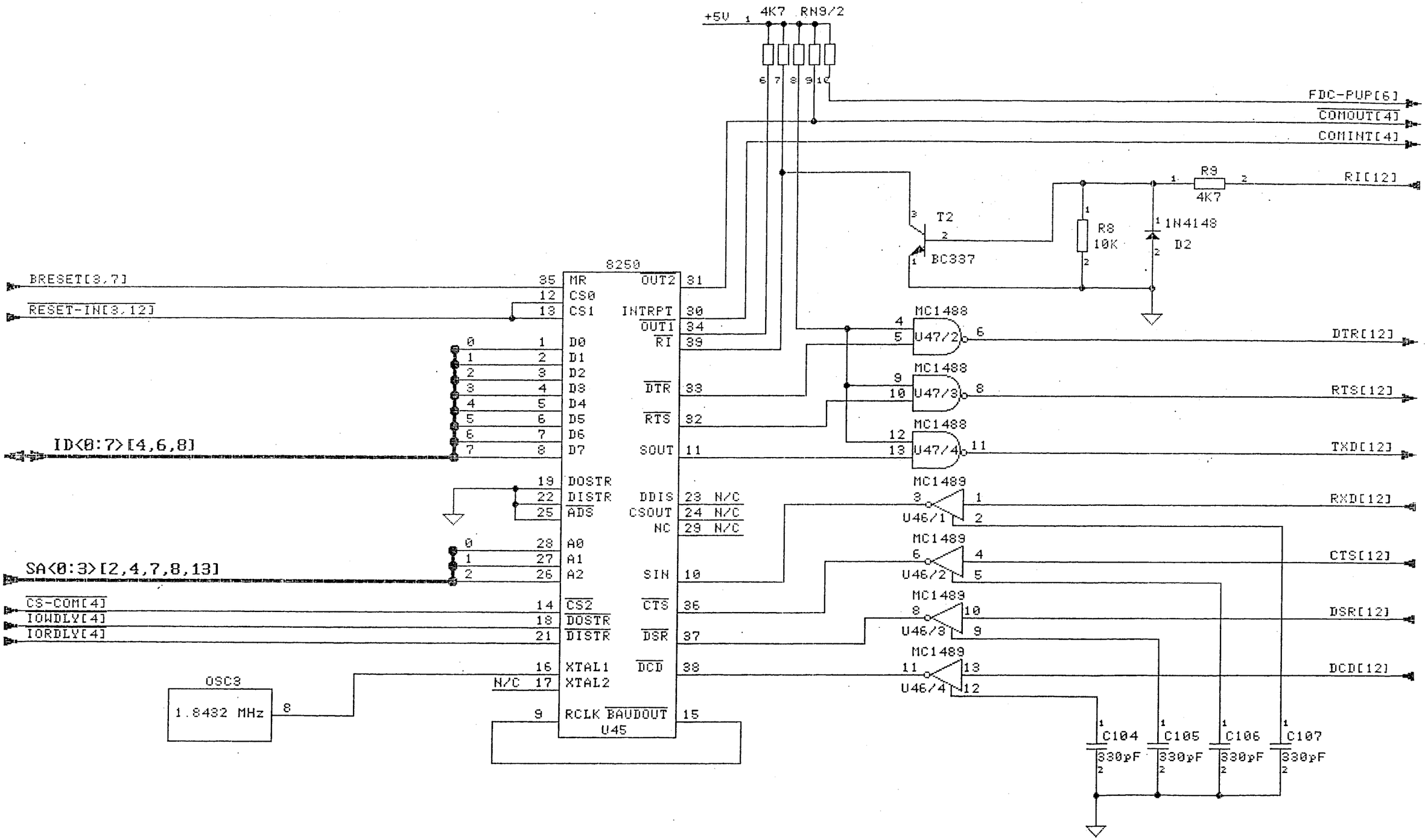
commodore, bsw

DRAWN BY: B, ASSMANN	TITLE: SCHEMATIC PC-I 1-7		
APPROVED:			
USED ON: PC - I	SIZE A3	380 150	REV 4
DATE: 08-10-87	SHEET: 5 of 14		



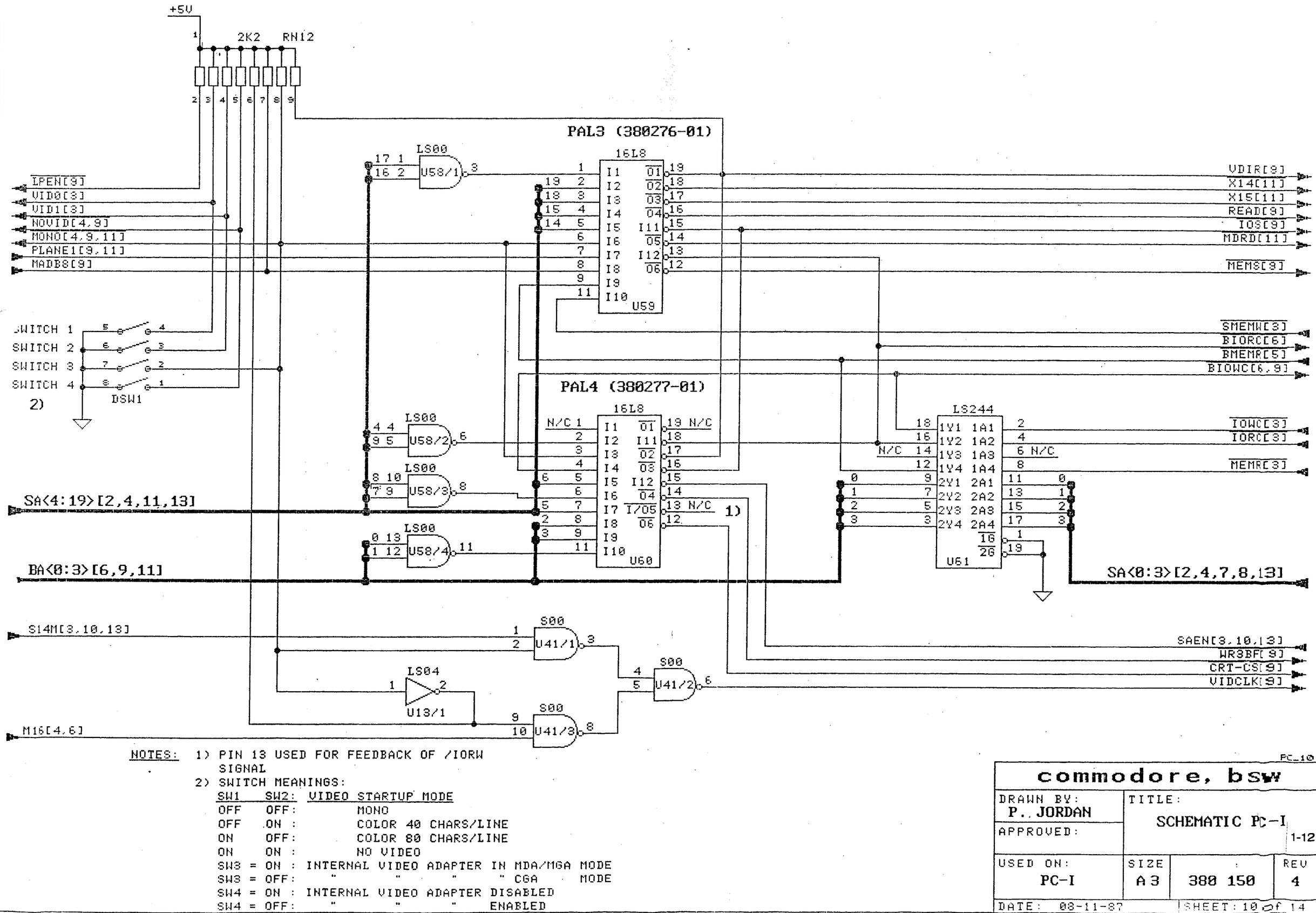
PC_8

commodore, b≤w			
DRAWN BY: H. ULLRICH	TITLE: SCHEMATIC PC-I 1-10		
APPROVED:			
USED ON: PC-I	SIZE A3	380 151	REV 4
DATE: 08-10-87	SHEET: 8 of 14		



PC_7

commodore, bsw			
DRAWN BY: H. ULLRICH	TITLE: SCHMATIC PC-I 1-9		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-10-87	SHEET: 7 of 14		



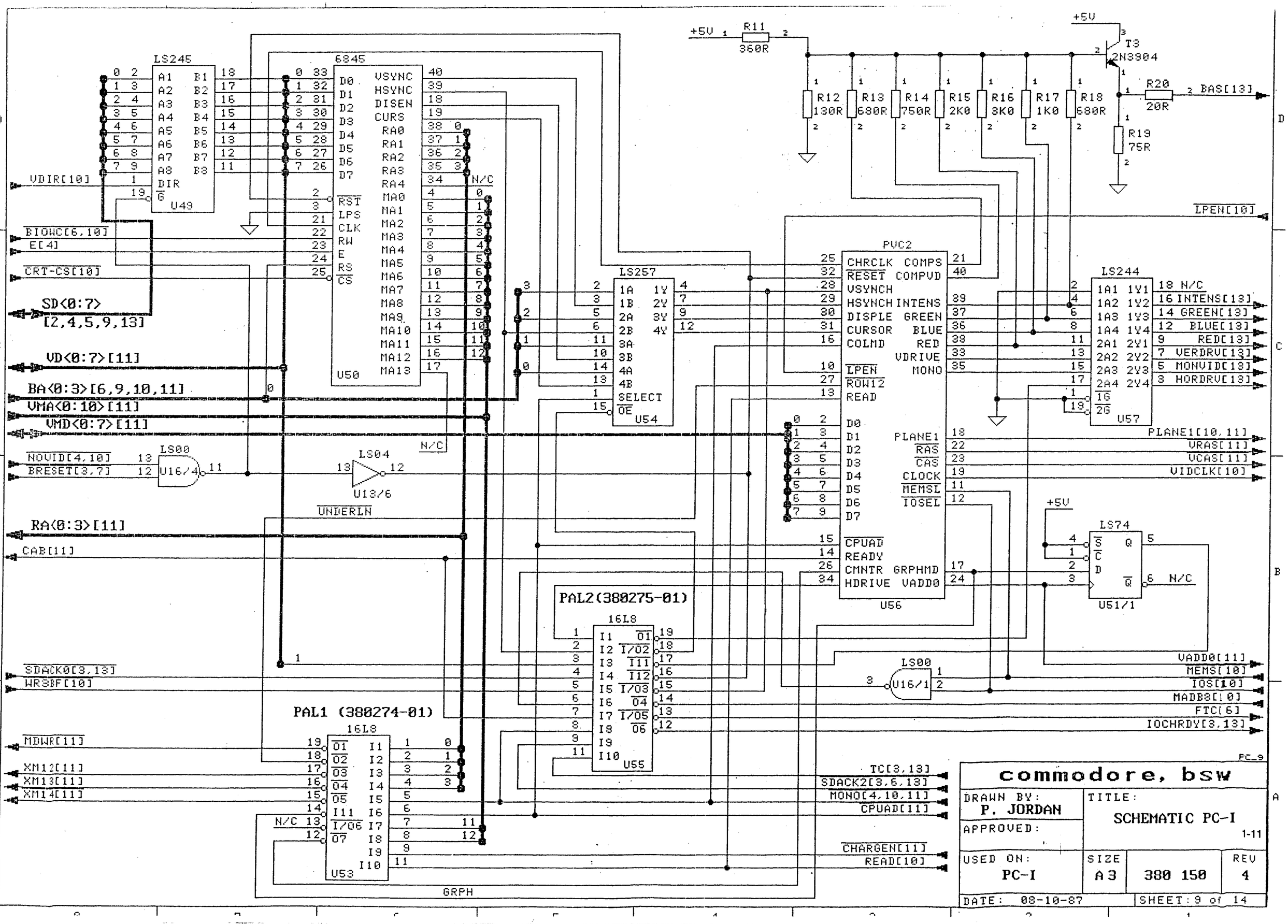
NOTES:
1) PIN 13 USED FOR FEEDBACK OF /IORW SIGNAL
2) SWITCH MEANINGS:

SW1	SW2:	VIDEO STARTUP MODE
OFF	OFF:	MONO
OFF	ON :	COLOR 40 CHARS/LINE
ON	OFF:	COLOR 80 CHARS/LINE
ON	ON :	NO VIDEO

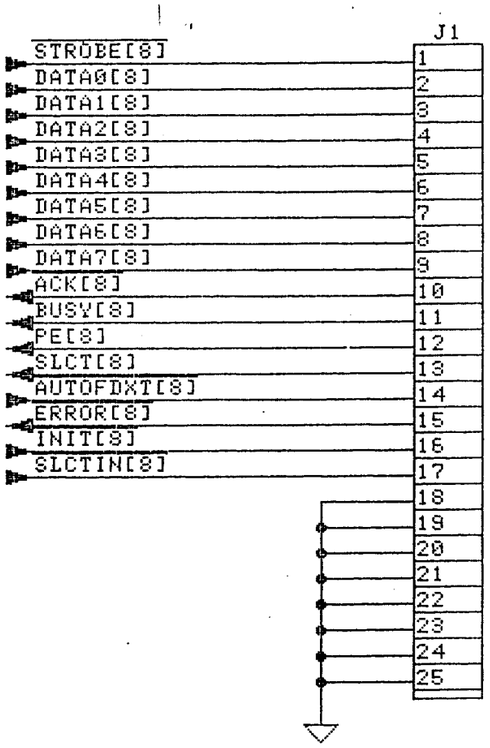
SW3 = ON : INTERNAL VIDEO ADAPTER IN MDA/MGA MODE
SW3 = OFF: " " " " CGA MODE
SW4 = ON : INTERNAL VIDEO ADAPTER DISABLED
SW4 = OFF: " " " ENABLED

PC_10

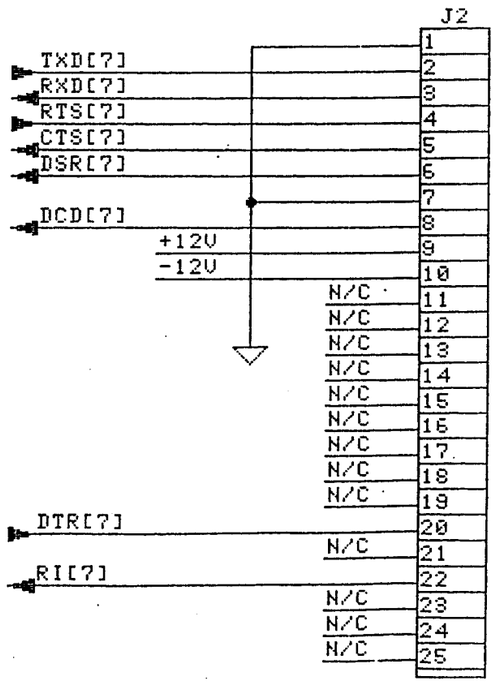
commodore, bsw			
DRAWN BY: P. JORDAN	TITLE: SCHEMATIC PC-I		1-12
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-11-87	SHEET: 10 of 14		


LS245
U49
6845
U50
LS257
U54
PVC2
U56
LS244
U57
LS74
U51/1
LS00
U16/4
LS04
U13/6
LS00
U16/1
PAL2(380275-01)
16L8
U55
PAL1 (380274-01)
16L8
U53
+5V
R11
360R
T3
2N3904
R12 130R
R13 680R
R14 750R
R15 2K0
R16 3K0
R17 1K0
R18 680R
R20 20R
R19 75R
BAS[13]
LPEN[10]
VDIR[10]
BIOWC[6,10]
E[4]
CRT-CS[10]
SD<0:7>
[2,4,5,9,13]
VD<0:7>[11]
BA<0:3>[6,9,10,11]
VMA<0:10>[11]
VMD<0:7>[11]
NOVID[4,10]
BRESET[3,7]
UNDERLN
RA<0:3>[11]
CAB[11]
SDACK0[3,13]
WR3BF[10]
MDWR[11]
XM12[11]
XM13[11]
XM14[11]
GRPH
TC[3,13]
SDACK2[3,6,13]
MONO[4,10,11]
CPUAD[11]
CHARGEN[11]
READ[10]
PLANE1[10,11]
VRAS[11]
VCAS[11]
VIDCLK[10]
VADD0[11]
MEMS[10]
IOS[10]
MADB8[10]
FTC[6]
IOCHRDY[3,13]
PC_9
commodore, bsw
DRAWN BY: P. JORDAN
APPROVED:
TITLE: SCHEMATIC PC-I
1-11
USED ON: PC-I
SIZE A3
380 150
REV 4
DATE: 08-10-87
SHEET: 9 of 14

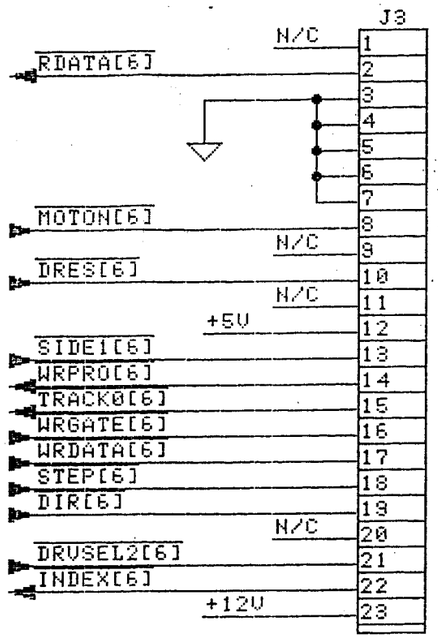
PARALLEL PORT
25 PIN SUBD CONN. FEM.



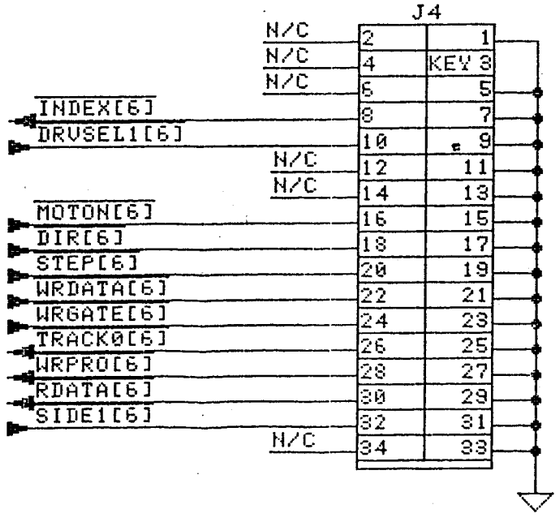
SERIAL PORT
25 PIN SUBD CONN. MALE



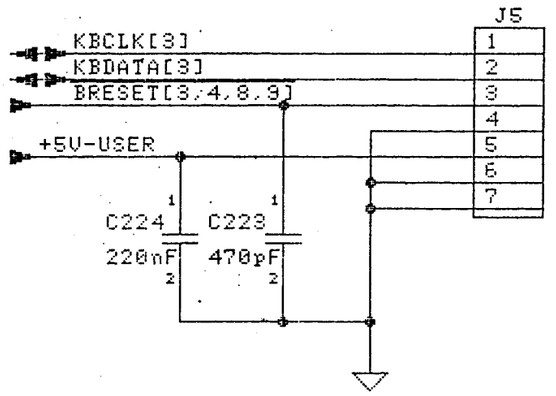
EXTERNAL DRIVE
(DRIVE B:)
23 PIN SUBD CONN.



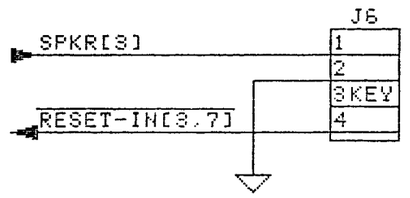
INTERNAL DRIVE
(DRIVE A:)



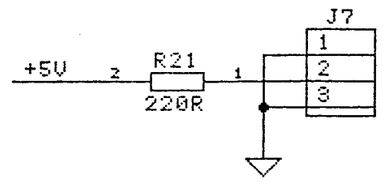
KEYBOARD



SPEAKER

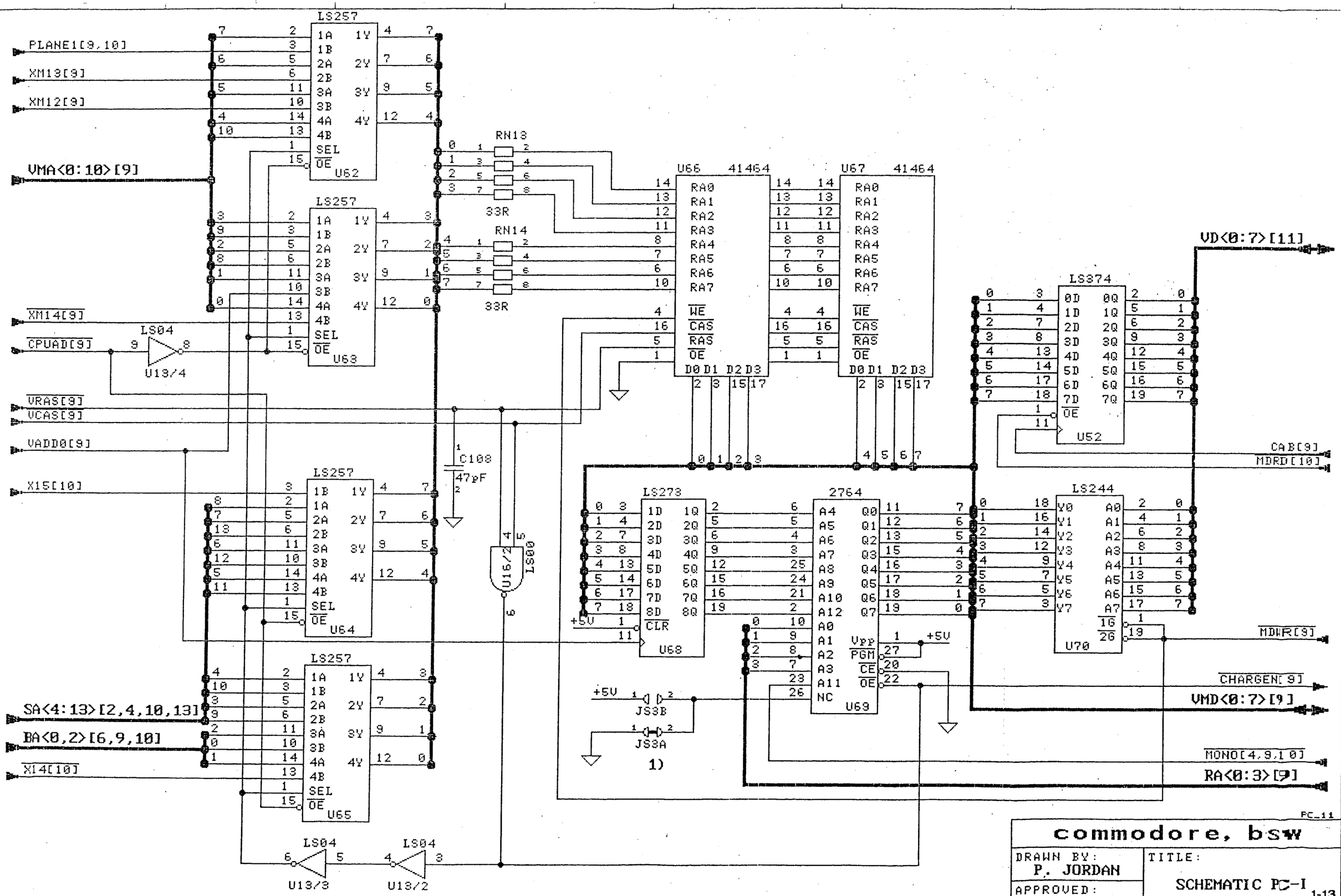


POWER-ON LED



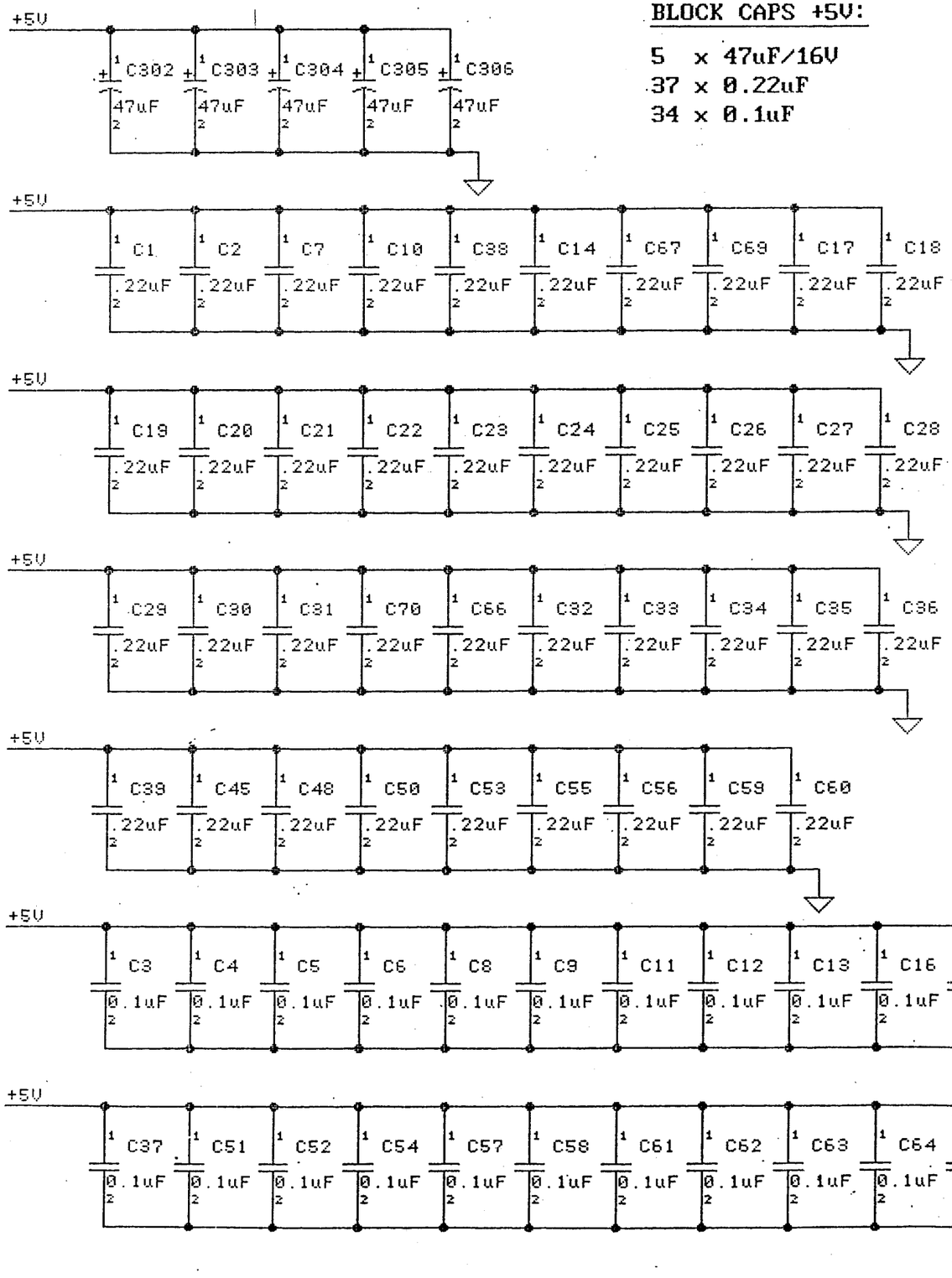
PC_12

commodore, bsw			
DRAWN BY: P. JORDAN	TITLE: SCHEMATIC PC-I 1-14		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-10-87	SHEET: 12 of 14		



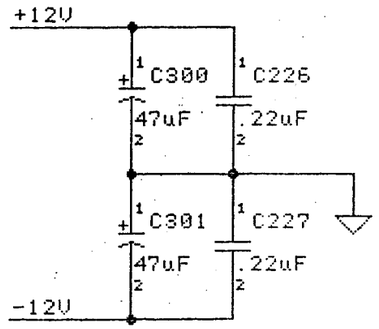
NOTES: 1) JS3A,B ARE USED IF 27128 EPROM OR 23128 ROM IS USED (SWITCHING BETWEEN 2 CHAR SETS) FOR U69

commodore, bsw			
DRAWN BY: P. JORDAN	TITLE: SCHEMATIC PC-I 1-13		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-11-87	SHEET: 11 of 14		



BLOCK CAPS +5V:

5 x 47uF/16V
37 x 0.22uF
34 x 0.1uF



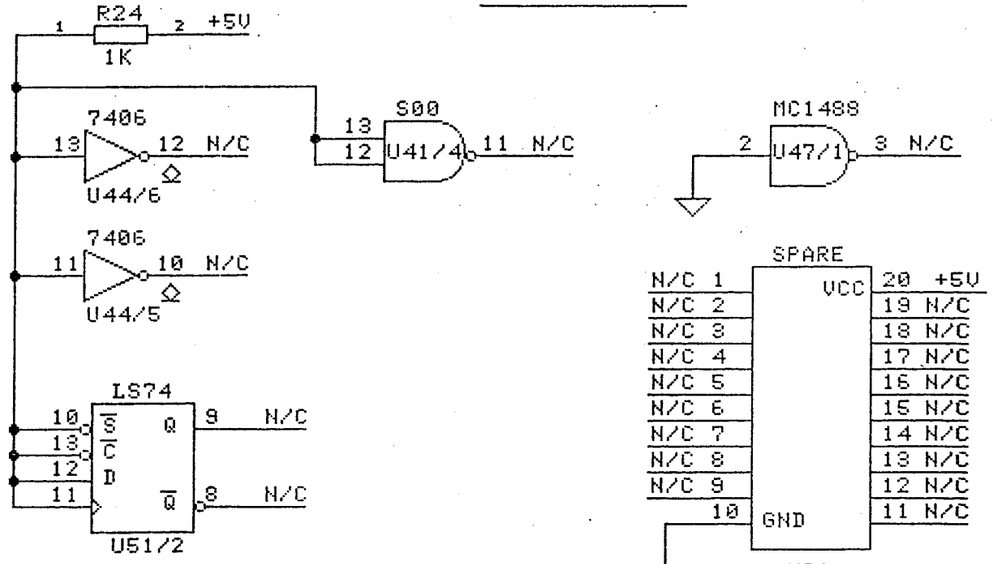
BLOCK CAPS +12V:

1 x 47uF/25V
1 x 0.22uF

BLOCK CAPS -12V:

1 x 47uF/25V
1 x 0.22uF

SPARE GATES:



PC_14

commodore, bsw			
DRAWN BY: H. ULLRICH	TITLE: SCHEMATIC PC-I 1-16		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-11-87	SHEET: 14 of 14		

MOUSE

J8

1	VP
2	HP
3	VQ
4	HQ
5	BM
6	BL
7	+5V-USER
8	
9	BR

+5V — 1 — 27K — RN15 — 2 3 4 5 6 7 8

VP → VP[4]
HP → HP[4]
VQ → VQ[4]
HQ → HQ[4]
BM → BM[4]
BL → BL[4]
+5V-USER → +5V-USER
BR → BR[4]

C216 C217 C218 C219 C220 C221 C222 — 10nF

EXPANSION

J12B J12A

SRESET[3]
IRQ<2:7> [3,4,6,8] — 2
C225 — 220nF

J12B	J12A		
	1	1	7
	2	2	6
	3	3	5
	4	4	4
	5	5	3
DRQ2[3,6]	6	6	2
	7	7	1
	8	8	0
IOCHCK[3]	9	9	
	10	10	
SMEMW[4,8]	11	11	19
SMEMR[4,8]	12	12	18
SIOWC[4,8]	13	13	17
SIORC[4,8]	14	14	16
SDACK3[3]	15	15	15
DRQ3[3]	16	16	14
SDACK1[3]	17	17	13
DRQ1[3]	18	18	12
SDACK0[3,9]	19	19	11
SCLK[3,4]	20	20	10
	21	21	9
7	22	22	8
6	23	23	7
5	24	24	6
4	25	25	5
3	26	26	4
SDACK2[3,6,9]	27	27	3
TC[3,9]	28	28	2
SALE[3,6]	29	29	1
S14M[3,10]	30	30	0

SD<0:7>[2,4,5,9]
IOCHRDY[3,4,9]
SAEN[3,4,10]
SA<0:19>[2,4,7,8]

VIDEO
RGB / MONO

J10

RED[9] GREEN[9] BLUE[9] INTENS[9] MONVID[9] HORDRV[9] VERDRV[9]

RN16 — 33R
R23 — 33R

C209 C210 C211 C212 C213 C214 C215 — 47pF

POWER

J9

1	+5V
2	+5V
KEY3	
4	+12V
5	-12V
6	
7	

R22 — 1R5 — +5V-USER
+5V
+12V
-12V

1) C231 C232 C233 C234 C235 C236 — 100pF

COMP. MONO

J11

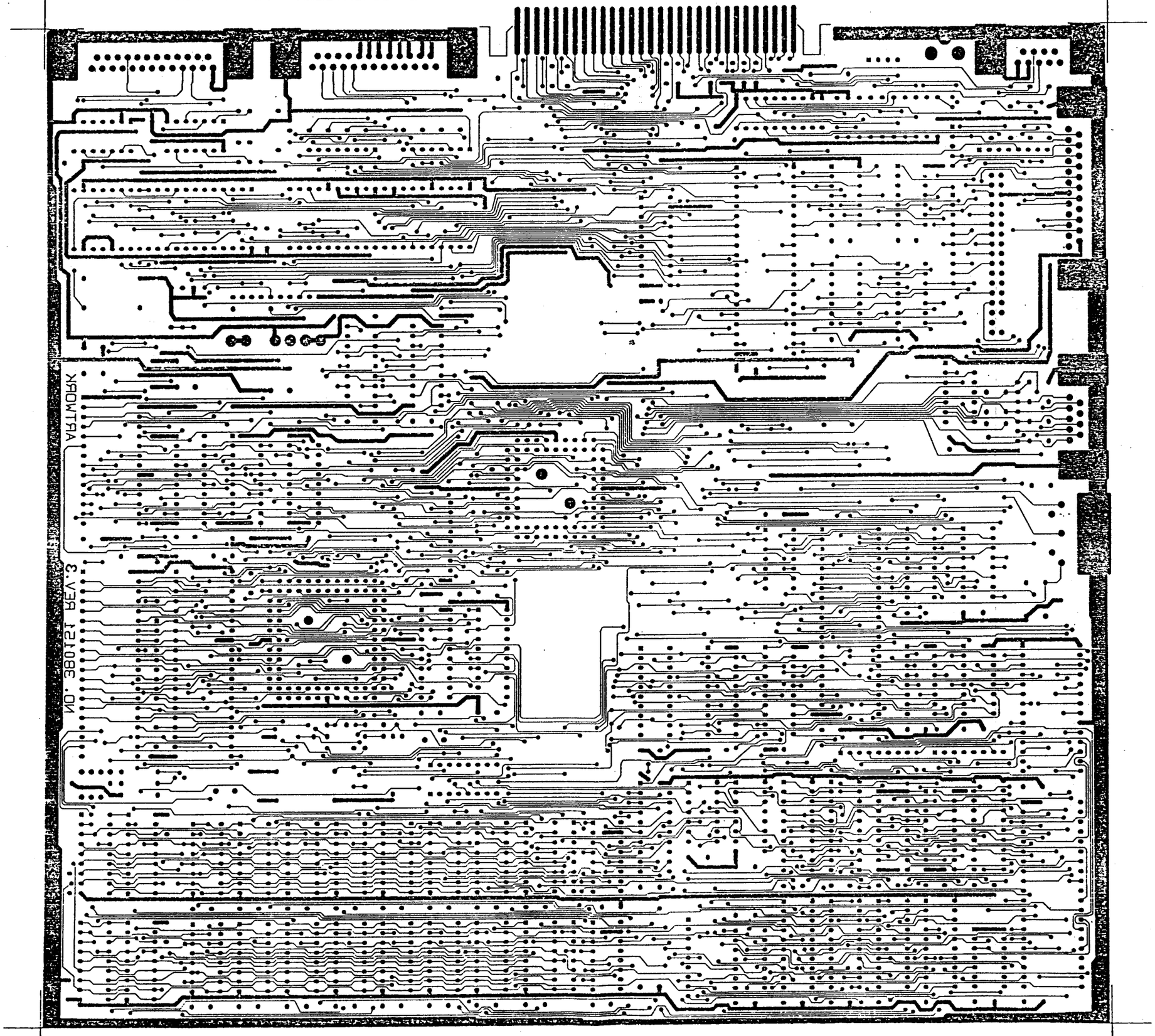
BAS[9]
N/C

NOTES: C231 TO C236 ASSEMBLED ONLY IF REQUIRED!

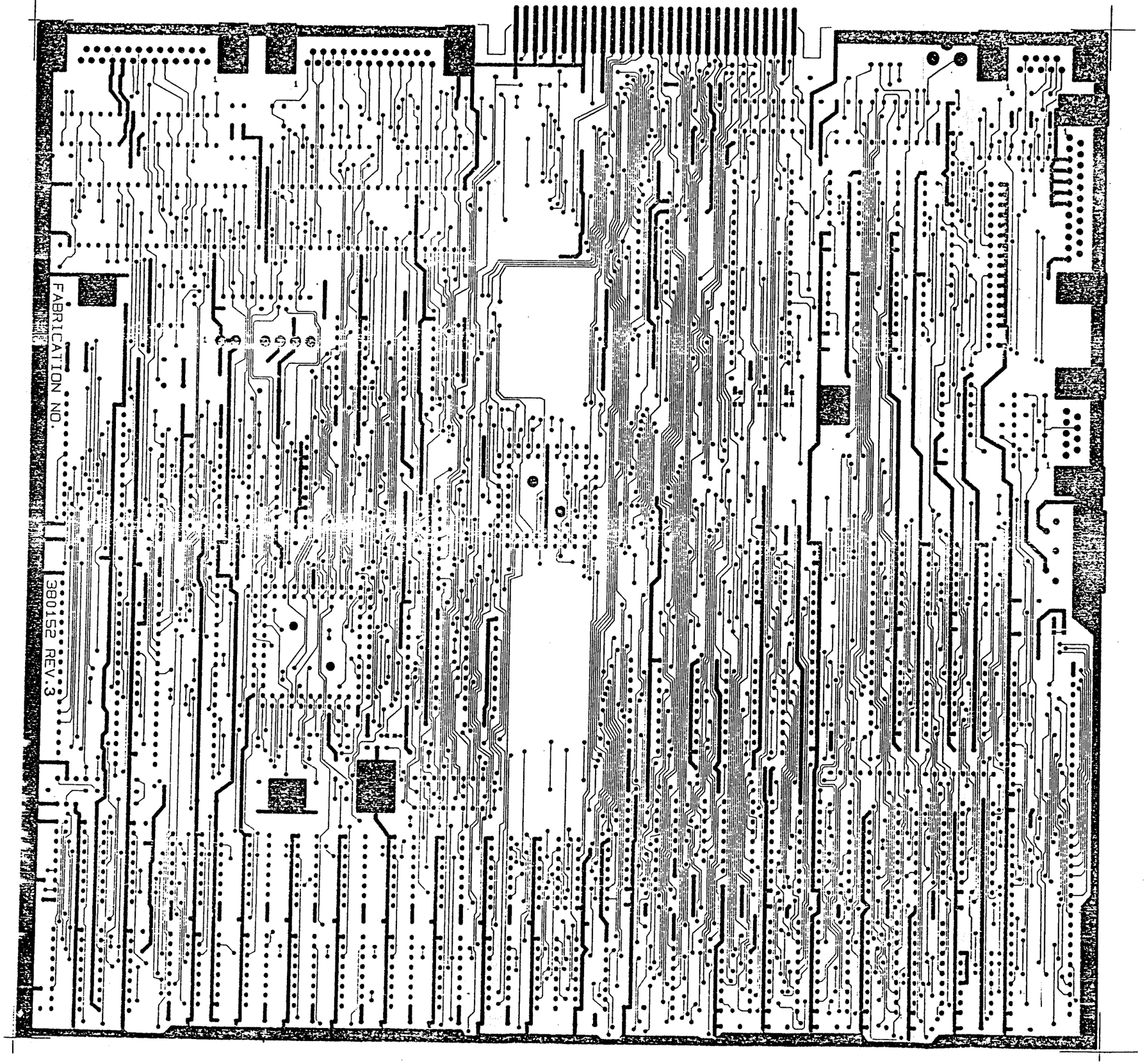
PC_13

commodore, bsw			
DRAWN BY: B. ASSMANN	TITLE: SCHEMATIC PC-I 1-15		
APPROVED:			
USED ON: PC-I	SIZE A3	380 150	REV 4
DATE: 08-11-87	SHEET: 13 of 14		

081S01 REL ELECTRONIC LAYOUT



081S01 REL ELECTRONIC LAYOUT



PC - I Connectors

J1 Parallel Port - 25 pin SUB-D female

1	/STROBE	14	/AUTOFDXT
2	DATA0	15	/ERROR
3	DATA1	16	/INIT
4	DATA2	17	/SLCTIN
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	/ACK	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT		

J2 Serial Port - 25 pin SUB-D male

1	GND	14	GND
2	TXD	15	GND
3	RXD	16	GND
4	RTS	17	GND
5	CTS	18	NC
6	DSR	19	NC
7	GND	20	DTR
8	DCD	21	NC
9	+12V	22	RI
10	-12V	23	NC
11	NC	24	NC
12	NC	25	NC
13	NC		

J3 ext. Floppy Disk B: - 23 pin SUB-D female

1	NC	13	/SIDE1
2	/RDATA	14	/WRPRO
3	GND	15	/TRACK0
4	GND	16	/WRGATE
5	GND	17	/WRDATA
6	GND	18	/STEP
7	GND	19	/DIR
8	/MOTON	20	NC
9	NC	21	/DRVSEL2
10	/DRES	22	/INDEX
11	NC	23	+12V
12	+5V		

J4 int. Floppy Disk A: - 34 pin

1	GND	2	NC
3	key	4	NC
5	GND	6	NC
7	GND	8	/INDEX
9	GND	10	/DRVSEL1
11	GND	12	NC
13	GND	14	NC
15	GND	16	/MOTON
17	GND	18	/DIR
19	GND	20	/STEP
21	GND	22	/WRDATA
23	GND	24	/WRGATE
25	GND	26	/TRACK0
27	GND	28	/WRPRO
29	GND	30	/RDATA
31	GND	32	/SIDE1
33	GND	34	NC

J5 Keyboard - 5 pin DIN with shield

1	KBCLK keyboard clock
2	KBDATA keyboard data
3	/KBRESET
4	GND
5	+5V-USER
6	GND
7	GND

J6 Speaker - 4 pin

1	SPKR
2	GND
3	key
4	/RESET-IN

J7 Power Led - 3 pin

1	GND
2	Led Anode (+5V)
3	GND

J8 Mouse - 9 pin SUB-D male

1	VERT. QUAL.	6	/BUTTON LEFT
2	HORZ. QUAL.	7	+5V-USER
3	VERT. PULSE	8	GND
4	HORZ. PULSE	9	/BUTTON RIGHT
5	/BUTTON MIDDLE		

J9 Power - 7 pin

1	+5V
2	+5V
3	key
4	+12V
5	-12V
6	GND
7	GND

J10 Video RGB/MONO - 9 pin SUB-D female

1	GND	6	INTENSITY
2	GND	7	MONO (VIDEO)
3	RED	8	HORDRV
4	GREEN	9	VERDRV
5	BLUE		

J11 Composite Video - 3 pin

1	BAS
2	GND
3	NC

J12 PC connector - 60 pin cardedge

B1	GND	A1	BD7
B2	RESETDRV	A2	BD6
B3	GND	A3	BD5
B4	IRQ2	A4	BD4
B5	GND	A5	BD3
B6	DRQ2	A6	BD2
B7	GND	A7	BD1
B8	GND	A8	BD0
B9	/IOCHCK	A9	IOCHRDY
B10	GND	A10	BAEN
B11	/BMEMW	A11	BA19
B12	/BMEMR	A12	BA18
B13	/BIOW	A13	BA17
B14	/BIOR	A14	BA16
B15	/BDACK3	A15	BA15
B16	DRQ3	A16	BA14
B17	/BDACK1	A17	BA13
B18	DRQ1	A18	BA12
B19	/BDACK0	A19	BA11
B20	BCLK (CPU CLOCK)	A20	BA10
B21	IRQ7	A21	BA9
B22	IRQ6	A22	BA8
B23	IRQ5	A23	BA7
B24	IRQ4	A24	BA6
B25	IRQ3	A25	BA5
B26	/BDACK2	A26	BA4
B27	TC	A27	BA3
B28	BALE	A28	BA2
B29	GND	A29	BA1
B30	BOSC (14.318MHz)	A30	BA0

ASIC - MIO - Mouse & Input/Output

INP = INPUT, OUT = OUTPUT

PIN#	SIGNAL NAME	DIRECTION	
14	BD0	I/O	with pullup
15	BD1	I/O	with pullup
16	BD2	I/O	with pullup
17	BD3	I/O	with pullup
20	BD4	I/O	with pullup
21	BD5	I/O	with pullup
22	BD6	I/O	with pullup
23	BD7	I/O	with pullup
6	BA0	INP	
5	BA1	INP	
4	BA2	INP	
3	BA3	INP	
68	BA4	INP	
67	BA5	INP	
66	BA6	INP	
65	BA7	INP	
64	BA8	INP	
63	BA9	INP	
36	M16	INP	Schmitt trigger
62	/BIORC	INP	
60	/BIOWC	INP	
57	/IOR-DLY	OUT	
56	/IOW-DLY	OUT	
61	BAEN	INP	
37	IRQ2	OUT	tristate
38	IRQ3	OUT	tristate
39	IRQ4	OUT	tristate
40	IRQ6	OUT	tristate
43	DRQ2-IN	INP	
42	DRQ2	OUT	tristate
41	IRQ6-IN	INP	
24	/BDACK2	INP	
25	/IDIR	OUT	
26	/NOVID	OUT	open drain with pullup
28	/MONO	INP	with pullup
8	/RESET	INP	Schmitt trigger
59	COM-INT	INP	Schmitt trigger
58	/COM-OUT	INP	Schmitt trigger
55	/CS-LPT	OUT	
54	/CS-COM	OUT	
51	/CS-FDC	OUT	
50	/CS-LDOR	OUT	
49	/CS-FDCXTR	OUT	
48	/CS-HDC	OUT	
47	/CS-RTC	OUT	

46	FDC-RESET	OUT	
45	DRV-SEL1	OUT	
44	DRV-SEL2	OUT	
27	/BL	INP	Schmitt Trigger with pullup
29	/BM	INP	Schmitt Trigger with pullup
30	/BR	INP	Schmitt Trigger with pullup
31	HQ-I	INP	Schmitt Trigger with pullup
32	HP-I	INP	Schmitt Trigger with pullup
33	VQ-I	INP	Schmitt Trigger with pullup
34	VP-I	INP	Schmitt Trigger with pullup
9	RS0	INP	
11	RS1	INP	
13	RS2	INP	
7	SCLK	INP	
12	IOCHRDY	OUT	open drain
10	/WAIT	INP	with pullup
2	/BDACK0	INP	
53	TEST	INP	
18	GND		
19	GND		
52	GND		
1	VDD		
35	VDD		
68 pins		I/O	

PIN#	SIGNAL NAME	DIRECTION	
1	VDD		
2	/BDACK0	INP	
3	BA3	INP	
4	BA2	INP	
5	BA1	INP	
6	BA0	INP	
7	SCLK	INP	
8	/RESET	INP	Schmitt trigger
9	RS0	INP	
10	/WAIT	INP	with pullup
11	RS1	INP	
12	IOCHRDY	OUT	open drain
13	RS2	INP	
14	BD0	I/O	with pullup
15	BD1	I/O	with pullup
16	BD2	I/O	with pullup
17	BD3	I/O	with pullup
18	GND		
19	GND		
20	BD4	I/O	with pullup
21	BD5	I/O	with pullup
22	BD6	I/O	with pullup
23	BD7	I/O	with pullup
24	/BDACK2	INP	
25	/IDIR	OUT	

26	/NOVID	OUT	open drain with pullup
27	/BL	INP	Schmitt trigger with pullup
28	/MONO	INP	with pullup
29	/BM	INP	Schmitt trigger with pullup
30	/BR	INP	Schmitt trigger with pullup
31	HQ-I	INP	Schmitt trigger with pullup
32	HP-I	INP	Schmitt trigger with pullup
33	VQ-I	INP	Schmitt trigger with pullup
34	VP-I	INP	Schmitt trigger with pullup
35	VDD		
36	M16	INP	Shmitt trigger
37	IRQ2	OUT	tristate
38	IRQ3	OUT	tristate
39	IRQ4	OUT	tristate
40	IRQ6	OUT	tristate
41	IRQ6-IN	INP	
42	DRQ2	OUT	tristate
43	DRQ2-IN	INP	
44	DRV-SEL2	OUT	
45	DRV-SEL1	OUT	
46	FDC-RESET	OUT	
47	/CS-RTC	OUT	
48	/CS-HDC	OUT	
49	/CS-FDCXTR	OUT	
50	/CS-LDOR	OUT	
51	/CS-FDC	OUT	
52	GND		
53	TEST	INP	
54	/CS-COM	OUT	
55	/CS-LPT	OUT	
56	/IOW-DLY	OUT	
57	/IOR-DLY	OUT	
58	/COM-OUT	INP	Schmitt trigger
59	COM-INT	INP	Schmitt trigger
60	/BIOWC	INP	
61	BAEN	INP	
62	/BIORC	INP	
63	BA9	INP	
64	BA8	INP	
65	BA7	INP	
66	BA6	INP	
67	BA5	INP	
68	BA4	INP	

MIO - Mouse and I/O Chip

1) Map of I/O's

/CS-COM	:	2F8 - 2FF	serial interface
		3F8 - 3FF	serial interface
/CS-LPT	:	278 - 27B	parallel interface
		378 - 27B	parallel interface
		3BC - 3BF	parallel interface
/CS-FDC	:	3F4 - 3F5	floppy disk controller
/CS-LDOR	:	3F2	floppy drive select register
/CS-FDCXTR	:	3F6	floppy disk extra register
/CS-RTC	:	2C0 - 2CF	real time clock
/CS-HDC	:	320 - 323	hard disk controller
/CS-RMODE	:	230	read mode register
/CS-WMODE	:	230	write mode register
/CS-RHCVC	:	23C	read horizontal or vertical count register
/CS-RDUMMY	:	23D	read dummy register
/CS-WDUMMY	:	23D	write dummy register
/CS-RSTAT	:	23E	read mouse status register
/CS-WCONT	:	23E	write mouse command register

2) Register description

a) MODE-REGISTER

I/O-address: 230 hex
access-mode: I/O read/write

all bits are cleared to 0 by applying /RESET = L

read/write 230

BIT	7	6	5	4	3	2	1	0
	video	clock		mouse	serial		parallel	
write	off/on	off/on	n.u.	off/on	COM1	COM0	LPT1	LPT0
read	mon/col	off/on	n.u.	off/on	COM1	COM0	LPT1	LPT0

Bit 0 to 6 can be read back, on write bit 7 enables/disables the video, on read bit 7 holds the content of the video DIP - switch

BIT #	function
0	select LPT interface bit LPT 0
1	select LPT interface bit LPT 1
2	select COM interface bit COM 0
3	select COM interface bit COM 1
4 = 0	disable mouse interface and IRQ2
= 1	enable mouse interface and IRQ2
5	not used
6 = 0	RTC disabled
= 1	RTC enabled
7 write 0:	video disabled
write 1:	video enabled
read 0:	monochrome video selected
read 1:	color video selected

LPT 1	LPT 0	LPT chip select
0	0	none
0	1	3BC - 3BF hex
1	0	378 - 37B hex
1	1	278 - 27B hex

COM 1	COM 0	COM chip select
0	0	none
0	1	2F8 - 2FF hex
1	0	3F8 - 3FF hex
1	1	none

b) MOUSE-CONTROL-REGISTER

I/O-address: 23E hex
access-mode: I/O write

all bits are cleared to 0 by applying /RESET = L
that is, after /RESET the mouse interrupt is enabled and the low nibble of the horizontal counter is selected

*) the mouse interface must be enabled also (see Bit 4)

```
BIT #      function
  0        not used
  1        not used
  2        not used
  3        not used
  4  = 0   mouse interrupt enabled  *)
     = 1   mouse interrupt disabled *)
  5  = 0   select low  nibble (bit 0 - 3)
     = 1   select high nibble (bit 4 - 7)
  6  = 0   select horizontal counter
     = 1   select vertical counter
  7  = 0   enable all mouse inputs
           the falling edge clears mouse counters
     = 1   disable all mouse inputs
```

c) MOUSE-STATUS-REGISTER

```
I/O-address:  23E hex
access-mode:  I/O read

BIT #      function
  0        always 1
  1        always 1
  2        always 1
  3        IRQ2 inverted, squarewave 32.8 msec *)
  4        always 0
  5        always 0
  6        always 0
  7        always 0

*) The mouse interface has to be enabled,
   MOUSE-CONTROL-REGISTER bit 4 has to be 0
   bit 3 is always 1 if MOUSE-CONTROL-REGISTER bit 4 is 1
```

d) HORIZONTAL-VERTICAL-COUNTER REGISTER

I/O-address: 23C hex
access-mode: I/O read

BIT #		function
0		bit 0 or bit 4 of mouse counter *)
1		bit 1 or bit 5 of mouse counter *)
2		bit 2 or bit 6 of mouse counter *)
3		bit 3 or bit 7 of mouse counter *)
4		always 0
5	= 0	left button depressed
	= 1	left button ~~depressed~~ released
6	= 0	middle button depressed
	= 1	middle button ~~depressed~~ released
7	= 0	right button depressed
	= 1	right button released

*) see bit 5 and 6 of the MOUSE-CONTROL-REGISTER

e) DUMMY REGISTER

I/O-address: 23D hex
access-mode: I/O read/write

The MicroSoft driver uses this register to recognize the mouse interface

Anschluß von Video-Monitoren an PC 1:

1. PC 1 im Monochrom-Modus (MDA, MGA)

DIP-Schalter 3 ist ON

An den Video RGB/Mono-Anschluß (9-Pin SUB-D Buchse) muß ein TTL-Monochrom-Monitor (H-Sync = 18.4 kHz, V-Sync = 50 Hz) angeschlossen werden.

Der Composite-Video-Anschluß (Cinch-Buchse) ist in diesem Modus nicht benutzbar!

2. PC 1 im Farb-Modus (CGA)

DIP-Schalter 3 ist OFF

a) An den Video RGB/Mono-Anschluß muß ein TTL RGBI-Farbmonitor (H-Sync = 15.6 kHz, V-Sync = 60 Hz) angeschlossen werden.

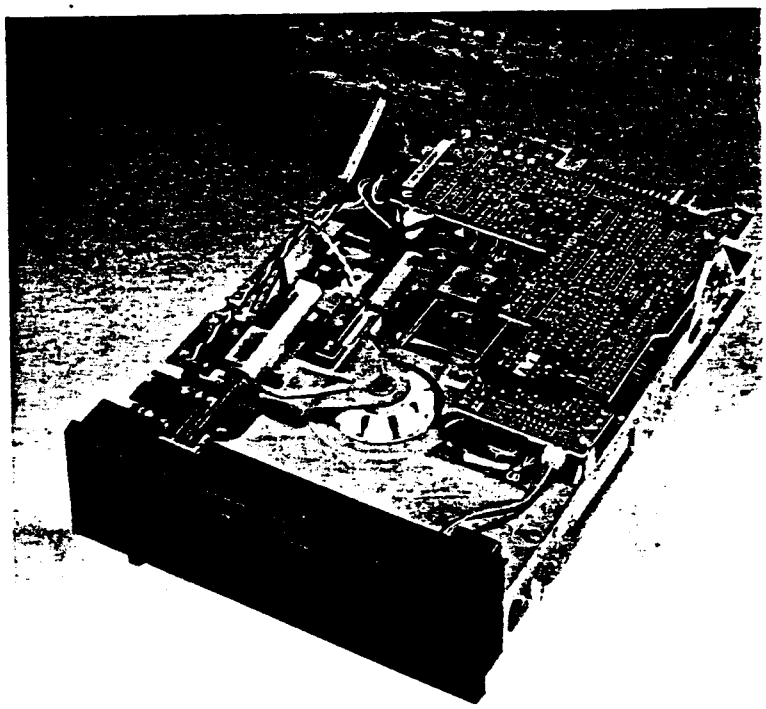
b) An den Composite-Video-Anschluß kann ein Monochrom-Monitor angeschlossen werden (Farben werden als Graustufen wiedergegeben).

Schalter 1	2	3	4	Bedeutung
OFF	OFF	--	--	einfarbige Anzeige
OFF	ON	--	--	Farbe, 40 Zeichen/Zeile
ON	OFF	--	--	Farbe, 80 Zeichen/Zeile
ON	ON	--	--	kein Videoteil (für Wartung)
--	--	ON	OFF	internes Videoteil einfarbig
--	--	OFF	OFF	internes Videoteil Farbe
--	--	--	ON	internes Videoteil abgeschaltet
--	--	--	OFF	internes Videoteil eingeschaltet

2.
Chinon Disk
Service Manuel

SERVICE MANUAL

CHINON 5-1/4" FLOPPY DISK DRIVES



CHINON
F-502II
F-502LII

CHINON INDUSTRIES, INC.

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SECTION 1

Maintenance Description

1-1. Maintenance

1-1-1. Periodical Maintenance

For this FDD (Floppy Disk Drive), periodic maintenance, e.g. parts replacement, lubrications are unnecessary for 5 years in normal use (when not used continuously for an extended period of time). However, as cleaning of the magnetic head with a cleaning disk is effective for improved data reliability, this cleaning should be done in accordance with item 1-3.

In addition, for especially frequent use or for a long time use over than 5 years, it is recommended to replace parts ass'y by ass'y according to their respective due times of replacement shown in Table 101. The parts whose due times of replacement are not shown need not replacing periodically.

For parts replacement, follow the relevant item in section 4, referring to the maintenance precautions in item 1-2.

Model			Maintenance Parts		Replacement	
F-502II	F-502LII (Rev. A)	F-502LII (Rev. B)	Parts Name	Parts No.	Replacement Cycle	Referred Items
×			Front Panel	051F1JC-1003A		4-1
	×	×	Front Panel	077F1JC-1001A		4-2
×	×	×	Control PC Board Ass'y	078F5JCSEP01A		4-3
×			Clamp Base Plate Ass'y	056F1JCU1005A	3×10^4 Clamps	4-4
	×		Clamp Base Plate Ass'y	078F1JCS1008A	3×10^4 Clamps	4-5
		×	Clamp Base Plate Ass'y	078F7JCS1008A	3×10^4 Clamps	4-5
×			Clamper Ass'y	051F1JCS1022A	3×10^5 Clamps	4-6
	×		Clamper Ass'y	077F1JCU1020A	3×10^5 Clamps	4-7
		×	Clamper Ass'y	078F1JCU1014A	3×10^5 Clamps	4-7
×	×	×	DD Motor Ass'y	078F5JC-EM01A	1×10^4 MOH	4-8
×	×		Head Carriage Ass'y	078F5JCS1051A	1×10^7 Seeks	4-9
		×	Head Carriage Ass'y	078F7JCS1051A	1×10^7 Seeks	4-9
×	×	×	Stepping Motor	078F5JC-EM02A	1×10^7 Seeks	4-10
×	×	×	Steel Belt	051F1JC-1053A		4-9, 10
×			Write Protect Sensor Ass'y	051F1JCSEP03B		4-11
	×	×	Write Protect Sensor Ass'y	077F1JCSEP02A		4-11
×			Index Sensor Ass'y	056F1JCSEP02B		4-12
	×	×	Index Sensor Ass'y	077F1JCSEP01A		4-12
×	×	×	Track 00 Sensor Ass'y	051F1JCSEP04B		4-13
×	×		Disk-in Sensor Ass'y	068F1JCSEP02A		4-14
		×	Disk-in Sensor Ass'y	078F7JCSEP02A		4-14

Table 101

1-1-2. Maintenance Aids

The necessary measuring instruments, tools, jigs are as follows:

(1) Measuring instruments

1. FDD tester
2. Oscilloscope (two channel)
3. Frequency counter
4. Digital voltmeter
5. Hygrometer (for relative humidity)

(2) Tools

1. Phillips screwdrivers (for M2, M2.5 and M3)
2. Small flat head screwdriver
3. Tweezers
4. Pliers
5. Nipper
6. Solder and soldering iron
7. Hex. wrench (jaw size 1.5 mm)

(3) Exclusive jig

1. Max. media jig

(4) Disks

1. Work disk (ordinary disk commercially available)
2. Cleaning disk for double sides (ordinary disk commercially available)
3. Reference disk for double sides double-density
   Disk No. RF21FDC
4. Alignment disk for double sides 48-TPI disk
   Disk No. CE21FDC

(5) Others

1. Pure alcohol or Daiflon
2. Cotton swab
3. Screw lock adhesive (Three-bond 1401C)
4. Screws and washers
5. Bond
6. Silicone oil (Toshiba silicone 2000 STC)

Note: Use correctly calibrated measuring instruments and disks.

1-2. Maintenance Precautions

1-2-1. Screw Tightening Torque and Screw Lock Adhesive

Unless otherwise specified, a screw should be tightened to its relevant torque, as shown in Table 102 below.

Screw size	Tightening torque
M2	2 kg-cm
M2.5	4.5 kg-cm
M3	6 kg-m

Table 102 Screw Tightening Torque

When loosening or tightening an M3 setscrew in adjustment or parts replacement, remove its attached lock adhesive, then apply a new screw lock adhesive.

1-2-2. Handling of Connectors

(1) Types of connectors

1. PJ1: Interface connector (34-pin, card-edge type)
2. PJ2: Power connector
3. PJ3: Stepping motor and sensor connectors
4. PJ4: DD motor connector
5. PJ5: Disk-in sensor connector
6. PJ6: Head connector
7. PJ7: Front LED connector
8. J1 : Short pin connector (10-pin) for drive selection

(2) Disconnection and insertion of connectors

Be sure to disconnect or insert a connector when power OFF. In this case, carry out disconnection or insertion straightly from the board to avoid exerting excessive force to connector pins and cables. Note that shaking up, down or right, and left for disconnection or insertion may cause contact failure.

(3) Handling precautions of stepping motor and sensor connectors (PJ3)

This PJ3 houses a combination of the stepping motor connector (6-pin) and the connector (8-pin) of the respective sensors. Each connector can be disconnected in such a way that it is separated from the housing by the cable side with the center of the post at the inserted side. When replacing the stepping motor for example, disconnect its associated connector and replace the stepping motor ass'y. Insert the connector in the reverse procedure to that of disconnection. (First, set in the post of the inserted side, then set in the post of the cable side.) (See Fig. 103.)

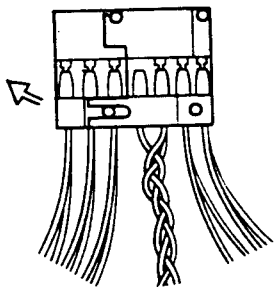


Fig. 103

(4) Drawing out of connectors pins

The pins in the PJ3 housing are secured as shown in Fig. 104. Draw the pins out while forcing up the stopper section slightly with tweezers.

Note that when the stopper section is forced up excessively, it does not return to its original shape. Also note that pulling the cable forcibly may cause a pin to be cut off at its solderless joint.

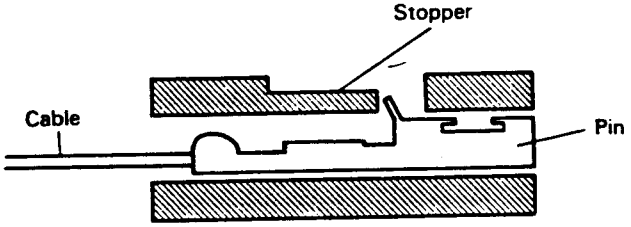
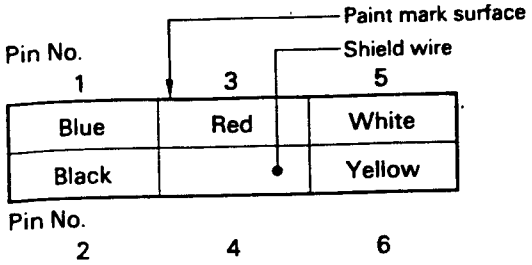


Fig. 104

(5) Insertion of connector pins

Insert the pins in the housing in the correct direction. Then, check that they are securely fixed by the stopper section by pulling the cable slightly.

Note: Pulling out and insertion of pin are carried out when a sensor ass'y is replaced.



Pin No.

14	12	10	8	6	4	2
Black	White	Blue	Erroneous insertion prevention pin	Yellow	Orange	Red
Yellow	Orange	Red	Green	Open	White	Brown
13	11	9	7	5	3	1

Pin No.

(6) Insertion of head connector

Insert the head connector into control PC board ass'y with the label or paint mark on the housing faced up. The S1 (white mark) should be located at front LED connector side.

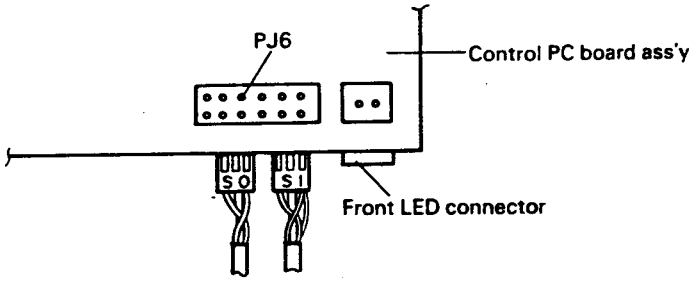


Fig. 105

1-2-3. Functions of Test Points

The following ten test points (with two GND) are provided on the control board, each of which is used in observing the waveform for FDD adjustment or check.

(1) TP1, TP2 (pre-amp output) and TP3 (analog GND)

These are the test points of the read amp output.

The signal from the head, after being amplified in level about 200 times by the pre-amp, and then filtered out by an LPF, after which it can be observed at test points TP1 and TP2. TP1 and TP2 are in 180° anti-phase to each other.

For accurate waveform observation, it is necessary to add the signals of both channels together (the signal of the one channel is inverted in phase) to observe these signals as one waveform using an oscilloscope with two channels. TP3 is used in grounding the oscilloscope.

TP1 and TP2 are used in checking the read/write head for its different characteristics or in checking and adjusting the tracking alignment, the index burst timing.

(2) TP4 (read data signal)

This is the test point of the read data pulse. The inverted READ DATA signal appears here.

In FM mode, a data signal with 2F or 1F period is observed, while in MFM mode, a data signal with 2F, 1.5F or 1F period is observed. (See Table 106.)

This test point is used in check and adjustment of asymmetry.

2F	4 μs
1.5F	6 μs
1F	8 μs

Table 106

(3) TP5 (Digital GND)

(4) TP6 (index sensor)

This is the test point of the index sensor photo-transistor output after it passes through the Schmitt inverter. Thus the inverted output signal appears at this test point.

TP6 is used in the following checks and adjustments.

1. Check and adjust disk rotating speed
2. Check and adjust index burst timing
3. For external trigger check and adjust tracking alignment

(5) TP7 (index sensor)

This is the test point of the index sensor photo-transistor output. A waveform with soft leading and trailing edges appears here, since the sensor output signal is taken out before flowing across the Schmitt inverter. Here it is necessary to check that the output voltage of the index sensor is normal (with no waveform split).

Note: Use TP6 in check and adjustment of index burst timing since the index burst timing may deviate according to its relevant manner of triggering.

(6) TP8 (write protect sensor)

This is the test point of the write protect sensor photo-transistor output. The inverted WRITE PROTECT output signal appears here. With a disk in which a measure.for write protection is taken (its notches are masked), it becomes high level.

The voltage at this test point should be more than 3 V in the write protect state and less than 0.5 V in the write enable state (the notches are open).

This test point is used in check and adjustment of the write protect sensor.

(7) TP9 (Disk-in sensor)

This is the test point of the disk-in sensor photo-transistor output.

This signal becomes high level when a disk is inserted into the FDD.

(8) TP10 (track 00 sensor)
This is the test point of the track 00 sensor photo-transistor output. The voltage at this test point should be within the range shown in Fig. 107.

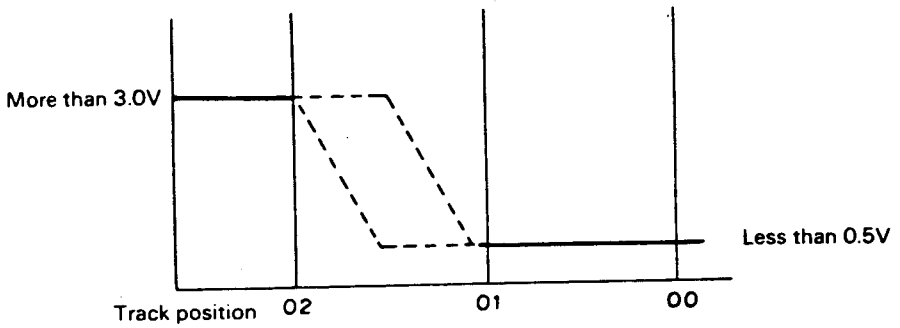


Fig. 107

Adjust so that the level of the sensor output changes between track 01 (Low level) and track 02 (High level).

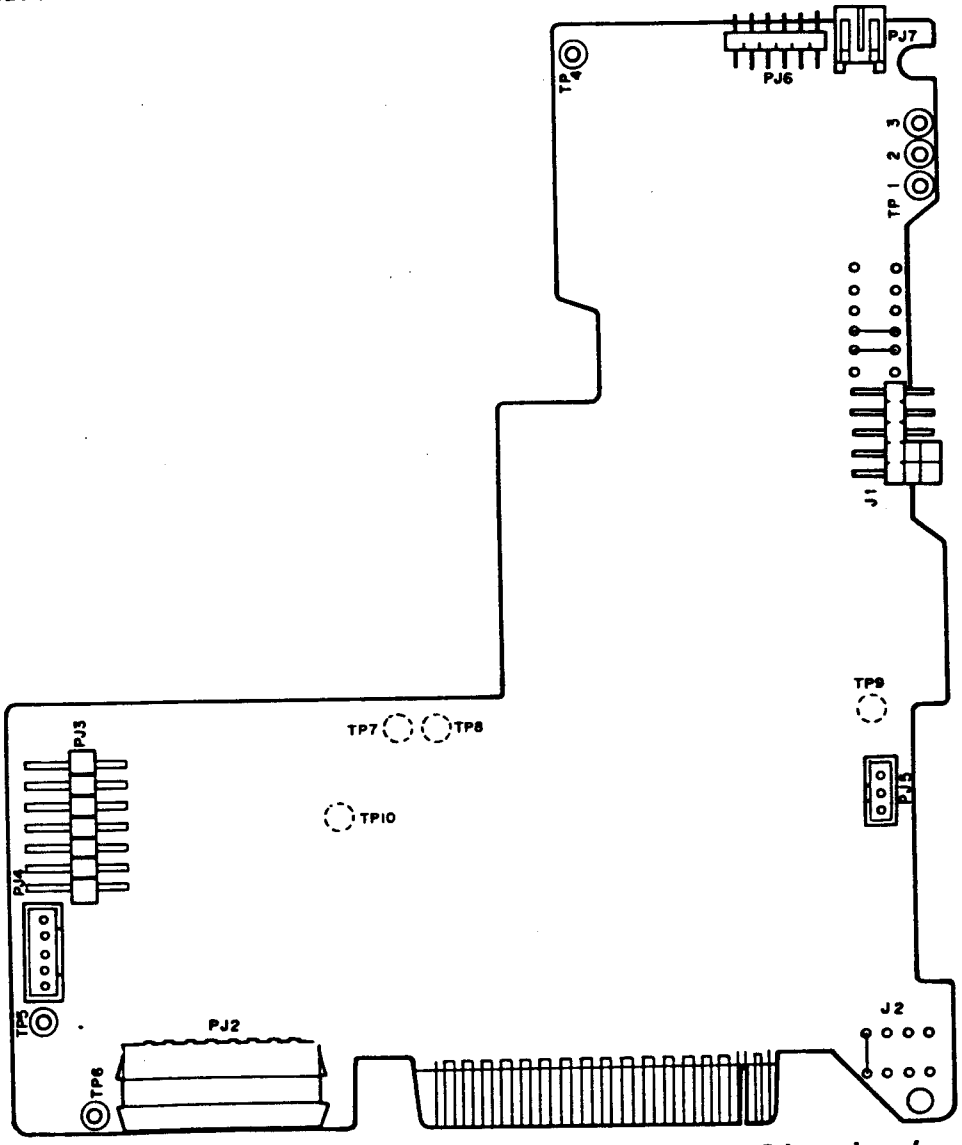


Fig. 108 Test points and connectors on the control PC board ass'y

1-2-4. Handling of Head Cable

It is necessary to correctly secure the head cable with sufficient length for smooth running of the head carriage on the disk surface. Secure the head cable about 90 mm away from the carriage edge to the clamp base plate with cable guide. (See Fig. 408.)

1-3. Periodic Maintenance

1-3-1. Cleaning of Magnetic Head by Cleaning Disk

When using the FDD in a dusty location, it is advisable to clean the magnetic head with a cleaning disk at regular intervals. When the magnetic head is cleaned occasionally even in a normal location, this is effective for improved data reliability.

(1) Maintenance aids

1. Cleaning disk
2. FDD tester or user system

(2) Cleaning procedure

General cleaning procedure is given. For details, refer to the Operation manual of the cleaning disk.

1. Rotate the DD motor, then load the cleaning disk.
2. Clean the head at an appropriate track position for about 10 to 30 seconds.
3. Remove the cleaning disk.

Note: Be sure to use a cleaning disk for double sides.

SECTION 2

Remedy

2-1. Diagnosis

Check the following items before judging the FDD's failure.

1. Whether connection and operation have been made properly.
2. Whether there is a program mistake in the host side.
3. Whether the disk is defective.
   This can be verified by checking whether the same failure occurs in several disks.
4. Whether the FDD is operated under appropriate environmental conditions.
   For example, check whether the location is exceedingly noisily or has an extremely strong magnetic field.
5. Whether the GND connection for the host side (signal GND and enclosure GND) is complete.
6. Whether the supply voltage is sufficient.

When the failure is not solved even by the above, as the cause of the failure lies in the FDD side, locate the cause the following flow chart:

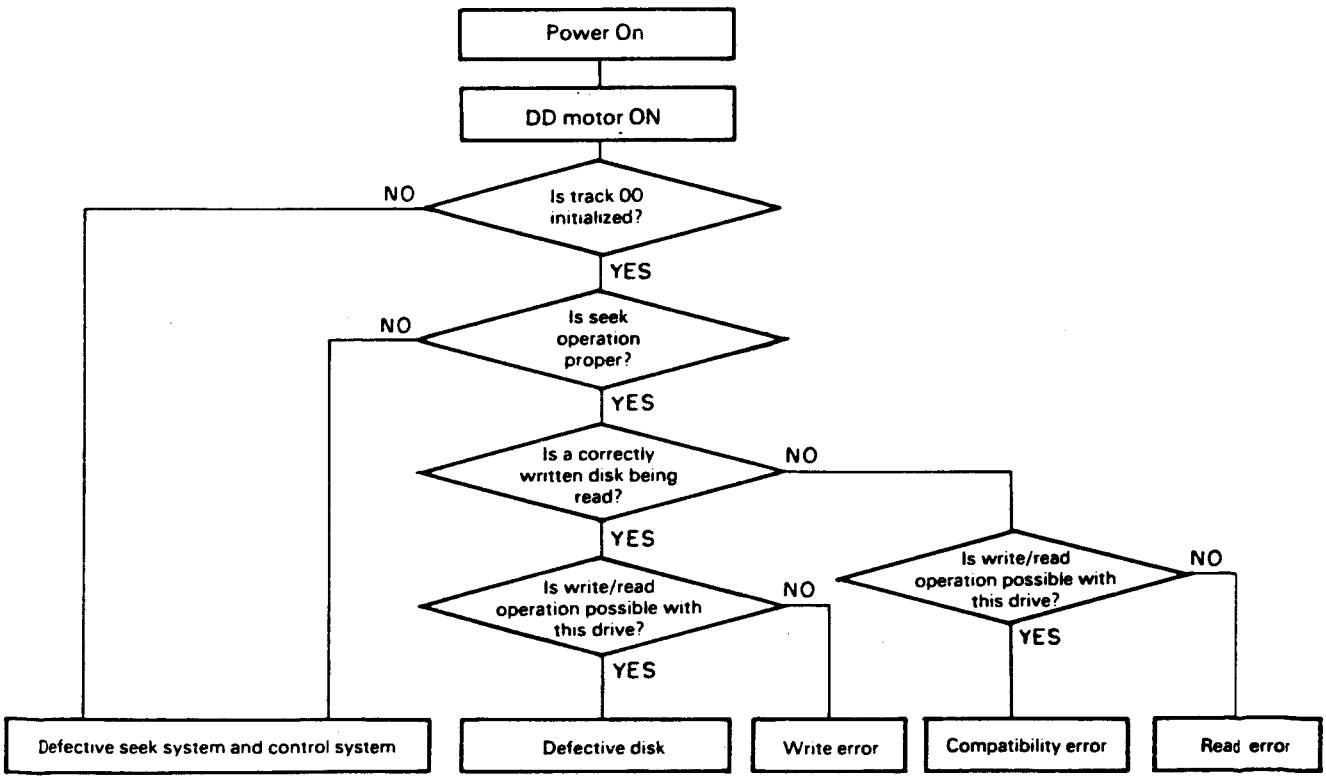


Fig. 201

2-2. Types of System Errors

2-2-1. Read Error

Most read errors which occur are recoverable, i.e. soft errors. After servicing to eliminate the cause of the error, check that the data can be read again.

(1) Causes of soft errors

1. An error occurs due to a dirty head or dirt between the head and the disk. In this situation, an error also occurs during write operation.
2. Defective disk
3. Defective rotation of DD motor
4. Head which improperly touches the disk
5. Large electrical or magnetic noise which occurs at random.
6. Improper connection with the host side
7. Defective index sensor
8. Defective tracking

(2) Servicing procedure

1. Clean the head (see item 1-3).
2. Check that the connection with the host side is proper. Especially, when the GND connection is unsecure, reinforce it.
3. Check the read level and the resolution (see item 3-8).
4. Check tracking with an alignment disk. Adjust it when deviated (see item 3-9).
5. Check the index sensor output pulse waveform and the pulse interval (disk rotating speed) at TP6. If abnormal, adjust them (see item 3-5).
6. Carry out check and adjustment of the head for touching the disk (see item 3-6).
7. Check and adjust the asymmetry (see item 3-7).

When the error is not solved by this procedure, the disk is not recoverable.

2-2-2. Write Error

Fist, check that data can be written in another work disk in which a measure for write inhibition has not taken, for the purpose of checking whether the write error is due to failure of the FDD or due to the defective disk. When the new work disk permits data writing, the old work disk is defective. Therefore, avoid further use of the old disk.

(1) Cause of FDD write failure

1. Dirty head
2. Faulty operation of write inhibit circuit
3. Head which improperly touches the disk
4. Improper rotation of disk

(2) Servicing procedure

1. Clean the head.
2. Check the write inhibit circuit (with the center of the write protect sensor) (see item 3-3).
3. Check and adjust the head for touching with the disk (see item 3-6).
4. Check and adjust the disk rotating speed (see item 3-5).

2-2-3. Seek Error

(1) Causes of seek error

1. Track 00 sensor defective
2. Faulty operation (irregular) due to large electrical noise

(2) Servicing against seek error

1. Check and adjust the track 00 sensor (see item 3-10).

2-2-4. Compatibility Error

F-502II/F-502LII assures compatibility with other drives in use under the environmental conditions specified. Thus, compatibility error seldom occurs. When the disk can be both written and read using the same drive but a disk written by another drive cannot be read, it can be assued that the problem lies in drive compatibility.

Therefore, check the drive compatibility.

(1) Causes of compatibility error

1. Tracking position (head position) deviated from the regular position
2. Improper rotation of disk
3. Head which improperly touches the disk
4. Improper read level and resolution
5. Improper asymmetry
6. Improper index burst timing

(2) Servicing procedure

1. Check and adjust the disk rotating speed (see item 3-5).
2. Check and adjust the tracking with an alignment disk (see item 3-9).
3. Check and adjust the head for touching with the disk (see item 3-6).
4. Check the read level and the resolution (see item 3-8).
5. Check and adjust the asymmetry (see item 3-7).
6. Check and adjust the index burst timing (see item 3-12).

SECTION 3

Check and Adjustment

3-1. Adjustment of Veil Position (For F-502II)

When the clamp base plate ass'y is replaced or when the machine is repaired, adjust the position of the veil as follows:

(1) Tools

ⓘ Hex. wrench for M1.5

ⓘ Screw lock adhesive

(2) Check and adjustment procedure

1. Lift the door lever (Fig. 408) to release the lock.
   (The door lever should be kept opened.)
2. Load the work disk (do not close the door lever).
3. Turn the veil adjusting screw so that the distance between the release spring and pop up lever when they start moving is 2.5 ~ 3 mm (Fig. 301).
4. If the value specified in item 3 cannot be obtained, adjust the veil adjusting screw.
5. Apply screw lock to the veil adjusting screw.
6. For setscrew mounting, refer to item 1-2-1.

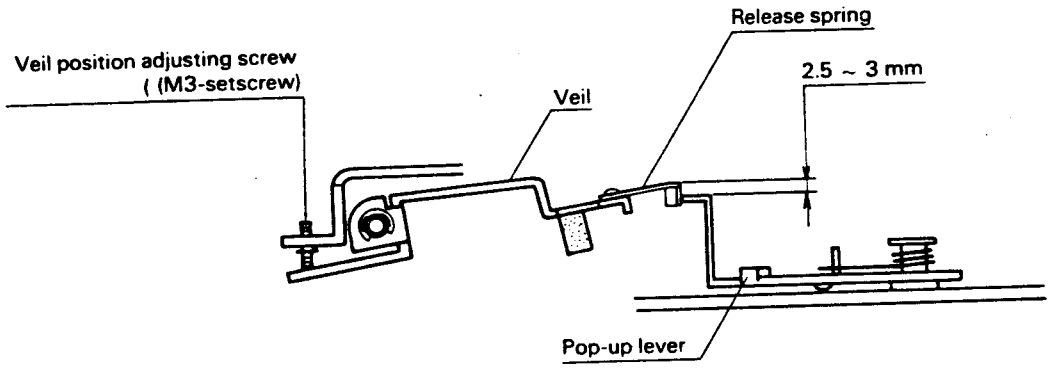


Fig. 301

3-2. Adjustment of Clamp Support Plate Position

When the following parts are replaced or when the machine is serviced, adjust the position of the clamp support as follows:

- ○ Clamp base plate ass'y
- ○ Clamper ass'y
- ○ DD motor ass'y

(1) Tools

① Phillips screwdriver for M2.5

② Screw lock adhesive

(2) Adjustment (This adjustment is not needed on F-502LII Rev.B.)

1. Push down the door lever (Fig. 408) to lock. In case of F-502LII, set the pop-up lever to the disk insertion position (Fig. 409) and set the front lever as shown in the right figure to lock.
2. Loosen two clamp support mounting screws.
3. Adjust the position of the clamp support and align the holes in the clamper guide and clamper shaft.
4. Tighten the screws to the specified torque and apply a small amount of screw lock adhesive. See Fig. 302.

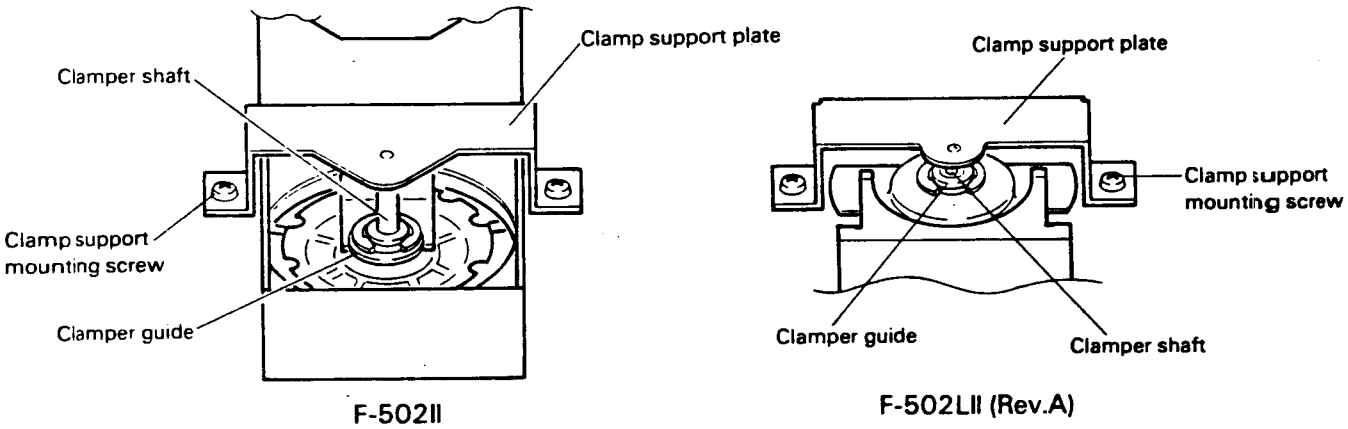


Fig. 302

3-3. Check of Write Protect Sensor

When replacing the following assemblies, be sure to check the write protect sensor.

- ○ DD motor ass'y
- ○ Write protect sensor ass'y

(1) Measuring instruments and jigs

① Max. media jig

② Digital voltmeter or oscilloscope

③ FDD tester

(2) Check procedure

1. Connect the digital voltmeter or oscilloscope to test point TP8 on the control PC board.
   Setting of oscilloscope: DC 1 V/div.
2. Insert the max. media jig at the position where notch A is on the path of the light from the write protect sensor.

3. Supply power to the FDD, then check that the voltage at TP8 is within the following range:
   Voltage at TP8 when notch A is on the light path: Less than 0.5V
4. Shift the max. media jig to the position where notch B is on the path of the light.
5. Supply power to the FDD, then check that the voltage at TP8 is within the following range:
   Voltage at TP8 when notch B is on the light path: More than 3.0V
6. When it is not within the specified range, check whether or not there is foreign matter on the light path. If so, remove it. If not, replace the write protect sensor ass'y in accordance with item 4-11.

3-4. Check of Disk-in Sensor

When replacing the disk-in sensor ass'y, be sure to check the disk-in sensor.

(1) Measuring instruments
   ① Work disk
   ② Digital voltmeter or oscilloscope
   ③ FDD tester

(2) Check procedure
1. Connect the digital voltmeter or oscilloscope to test point TP9 on the control PC board ass'y.
   Setting of oscilloscope: DC 1V/div.
2. Supply power to FDD, then check that the voltage at TP9 is within the following range:
   Voltage at TP9: Less than 0.5V
3. Insert the work disk and supply power to FDD, then check that the voltage at TP9 is within the following range:
   Voltage at TP9 when inserted work disk: More than 3V
4. When it is not within the specified range, check whether or not there is foreign matter on the light path. If so, remove it. If not, replace the disk-in sensor ass'y in accordance with item 4-14.

3-5. Check and Adjustment of Disk Rotating Speed

The rotating speed of the DD motor has been adjusted berore the DD motor ass'y is built in. When replacing or repairing this ass'y check and adjust the disk rotating speed according to the following procedure:

(1) Measuring instruments, and tools
   ① Small screwdriver
   ② Frequency counter
   ③ Work disk
   ④ FDD tester

(2) Check and adjustment procedure
1. Connect the frequency counter to TP6 and TP5.
2. Load the work disk and rotate the DD motor.
3. Set the head to track 00.
4. Check that separation between pulses at TP6 is within the following range:
   Pulse separation at TP6: 200 ± 3 ms
5. When the pulse separation is not within the specified range, adjust the variable resistor (see Fig. 412) on the servo PC board of the DD motor ass'y so that it is set to around the center value of the specified range.

3-6. Check and Adjustment of Head for Touching with Disk

When replacing or repairing the following parts or assemblies, check and adjust the head for touching with the disk according to the following procedure:

○ Head carriage ass'y

(1) Measuring instruments and tools

①Oscilloscope
②FDD tester
③Work disk

(2) Check and adjustment procedure

1. Connect the oscilloscope to TP1 or TP2 (pre-amp output).
   Setting of oscilloscope: AC 0. 2 V/div., 20 msec/div.
2. Load the work disk and rotate the DD motor.
3. Move the head to track 39.
4. Select the side 0.
5. Write one cycle of a 2F signal, then set the FDD in reproduction mode.
6. Measure the average read level for the above one cycle.
7. Pressing the upper section of the head arm very lightly (10 ~ 20 gram), execute step 5 and measure the read level as in step 6.
8. Check that the average read level at step 6 is more than 80% of the read level at step 7.
9. Select the side 1 and repeat items 5 ~ 8.
10. Move the head to track 00, then execute steps 4 ~ 9.
11. If the value specified in item 6 cannot be obtained, loosen the veil adjusting screw (Fig. 408) (by about 90°) and check again. After re-adjustment, be sure to check and adjust the veil position referring to item 3-1. (For F-502II)
12. When the requirement in step 6 is not met even by executing step 11, the following causes can be assumed.
    a. Disk defective:
       When the disk or jacket is deformed or damaged, replace the work disk.
    b. Head carriage ass'y defective:
       Replace it in accordance with item 4-9.

    Note: When pressing the head arm, be careful not to lower the rotating speed of the DD motor by pressing it with excessive force.

3-7. Check and Adjustment of Asymmetry

When replacing the following assemblies, check and adjust the asymmetry according to the following procedure:

○ Head carriage ass'y
○ Control PC board ass'y

(1) Measuring instruments and tools

①Oscilloscope
②Alignment disk
③FDD tester
④Small screwdriver
⑤Work disk

(2) Check and adjustment procedure

1. Connect the oscilloscope to TP4 on the control PC board.
   Setting of oscilloscope: DC 1 V/div.
2. Load the alignment disk and rotate the DD motor.

3. Move the head to track 39.
4. Select the side 0.
5. Check that the asymmetry meets the following value:
   Asymmetry (with alignment disk): Less than 0.6 μsec.
   Arrange so that three read data pulses can be observed on the oscilloscope screen. Then, check so that the split (asymmetry) width of the second read data pulse waveform from the trigger pulse.
6. Remove the alignment disk and load the work disk.
7. Write a 1F signal on track 39 and measure the split (asymmetry) width of the waveform as shown in Fig. 303.
8. Check that the asymmetry meets the following value:
   Asymmetry of 1F signal on track 39: Less than 0. 6 μsec
9. Select the side 1 and repeat items 5 ~ 8.
10. When the asymmetry does not meet the specified value, the following causes can be assumed.
    a. Disk defective:
       Replace the work disk.
    b. With high density of leak magnetic flux around FDD:
       When magnetic flux sources such as magnet, transformer, CRT, magnetizied iron, etc. are near the FDD, place them far away, then carry out the asymmetry check and adjustment once again.
    c. Head defective:
       Replace the head carriage ass'y in accordance with item 4-9.
    d. Read amp defective:
       Replace the control PC board ass'y in accordance with item 4-3.

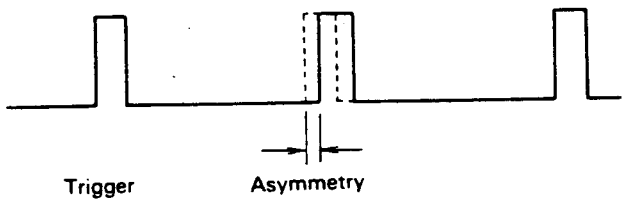


Fig. 303

3-8. Check of Read Level and Resolution

When replacing the following assemblies, check the read level and resolution.

- Head carriage ass'y
- Control PC board ass'y

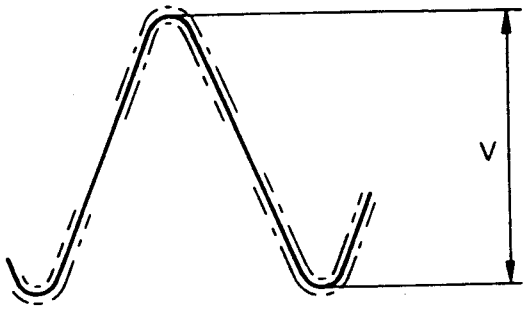
(1) Measuring instruments
   ① Oscilloscope
   ② FDD tester
   ③ Reference disk

'2) Check procedure

1. Connect the two channel oscilloscope to TP1 and TP2 (each for pre-amp output) on the control PC board.

   Setting of oscilloscope: AC 0.1 V/div, 2 ∿ 5 μs/div.

   Set channels CH1 and CH2 both to the above range, invert the signal of either channel and add the signal of both channels together.
2. Load the reference disk and rotate the DD motor.
3. Move the head to track 39.
4. Select the side 0.
5. Write one cycle of a 2F signal and measure the average read level. (See Fig. 304)



V: Average read level

Fig. 304

6. Put the read level in step 5 and the calibration value of the reference disk in the following equation, then calculate the true value of the read level.

   (True value of read level = average read level + calibration value)
7. Check that the true value of the read level meets the following value:

   Read level of 2F signal on track 39: More than 400 mVp-p
8. Write one cycle of a 1F signal with the above condition maintained, measure the average read level and find the true value of the read level in accordance with step 6.
9. Put the read levels of 1F and 2F signals in the following equation, and resolve.

$$\text{Resolution (true value)} = \frac{\text{read level of 2F signal (true value)}}{\text{read level of 1F signal (true value)}} \times 100\%$$

10. Check that the resolution meets the following value:

    Resolution on track 39: More than 60%
11. Select the side 1 and repeat items 5 ~ 10.
12. When the true value of the read level in step 7 and/or the result in step 10 does not meet the specified values, the following causes can be assumed.

    a. Reference disk defective:

       When the disk or the jacket is deformed or damaged, replace the reference disk.

    b. Improper rotation of disk:

       Check and adjust the rotating speed of the disk in accordance with item 3-5.

    c. Improper touching of head with disk:

       Check and adjust the head for touching with the disk in accordance with item 3-6.

    d. Head defective:

       Replace the head carriage ass'y in accordance with item 4-9.

    e. Control PC board read/write amp defective:

       Replace the control PC board in accordance with item 4-3.
13. Remove the reference disk.

6. After stepping in the head by one or several tracks from the original track position, step it out by the same number of steps to return it to the set track position, then measure values B1 to B4. Calculate the off-track amount as follows. (See Fig. 306)

Off-track amount (μm) = 2K.(B2−B3)/(B2+B3−B1−B4)

K = 40 μm

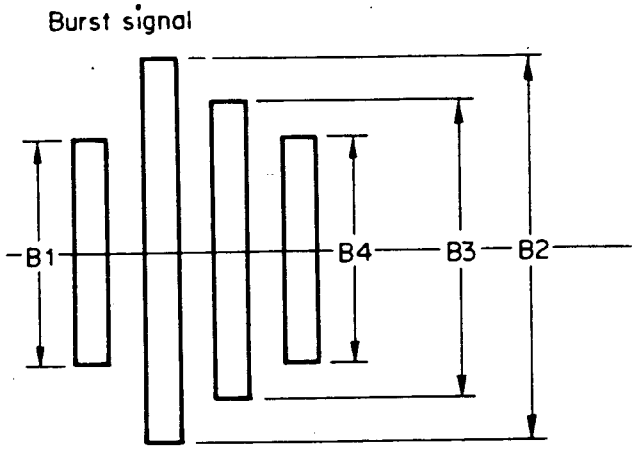


Fig. 306

7. After stepping out the head by one or several tracks from the original track position, step it in by the same number of steps to return it to the set track position, then measure values B1 to B4. Calculate the off-track amount in the same manner as item 6.
8. Select the side 1 and repeat items 4 ~ 7.
9. Check that the respective off-track amounts in items 6 and 7 are within the following range. when they are not within the specified range, adjust the tracking according to the adjustment procedure.

   Off-track amount (um) = ± 40μm

(3) Adjustment procedure

1. Loosen the stepping motor setscrews A and B. (Fig. 412)
2. Move the head to track 16.
3. Manually rotate the stepping motor body and monitor the burst signal waveform. (Fig. 305) When the burst signal waveform cannot be received, check with track 14 or 18.

   Note: To align with the excited phase of the stepping motor, be sure to move the head to an odd number track.
4. When the burst signal waveform is located, rotate the stepping motor body so that the right and left peak points of B2 and B3 become the same as the calibrated value. Then, secure the motor.
5. Step the head in and out repeatedly, and fine adjust the installation of the stepping motor so that the alignment error (difference between B2 and B3) of the burst signal waveform is minimized when the head is returned to the alignment check track inward and outward. When hystereses occur in inwards and outwards trackings, adjust so that both hystereses are equal.
6. Perform the same procedures on sides 0 and 1 so that the alignment error of the sides 0 and 1 becomes minimum.
7. Tighten the stepping motor retaining screws A and B in this order to a specified torque and repeat adjustment so that the alignment error is within ± 40 μm.
8. Apply screw lock to the stepping motor retaining screws.
9. Remove the alignment disk.
10. Adjust the track 00 sensor, referring to item 3-10.
11. Adjust the track 00 stopper, referring to item 3-11.

3-9. Check and Adjustment of Tracking Alignment

When replacing the following assemblies or part, be sure to check and adjust the tracking alignment.

- O Head carriage ass'y
- O Stepping motor ass'y
- O Steel belt
- O DD motor ass'y
- O Clamper ass'y

(1) Measuring instruments and tools

① Two channel oscilloscope
② Alignment disk
③ FDD tester
④ Phillips screwdriver for M3
⑤ Screw lock adhesive
⑥ Thermometer and hygrometer

(2) Check procedure

Check and adjust the tracking alignment at normal room temperature (about 23°C) and humidity (about 50%). Avoid check and adjustment under extreme environmental condition even when temperature and humidity are within the permissible ranges specified for the FDD and disk, because tracking adjustment may not be done exactly under such conditions. In addition, when the FDD and the alignment disk (CE disk) are left for more than two hours, until their temperatures are balanced with the normal environmental temperature, higher accuracy can be obtained. It is recommended that adjustment be made with the FDD in the same position as when housed in the system.

Similarly, it is advisable to use an alignment disk which has been checked for calibration (provided with correction data) with the standard drive. In addition, note that use of an alignment disk which has exceeded its life may cause inaccurate adjustment.

1. Connect the two channel oscilloscope to TP1 and TP2. Connect the external trigger input to TP6 (index sensor output).

   Setting of oscilloscope:
   CHI: AC 0.5 V/div., 20 msec/div.
   CH2: AC 0.5 V/div., 20 msec/div., inverted
   Others: Both outputs added together and external trigger used on the (+) trigger setting.

2. Rotate the DD motor and load the alignment disk.
3. Select the side 0
4. Move the head to alignment check track 16.
5. Check that the burst signal wave form in Fig. 305 is observed. If the burst signal wave form is not observed,the tracking is out of alignment.
   Adjust the tracking alignment.

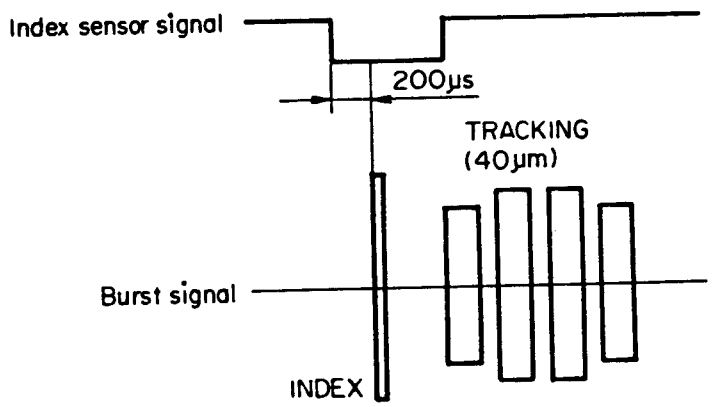


Fig. 305

3-10. Check and Adjustment of Track 00 Sensor

When adjusting or replacing the following assemblies or part, check and adjust the track 00 sensor.

- O Head carriage ass'y
- O S pping motor ass'y
- O S el belt
- O Track 00 sensor ass'y

(1) Measuring instruments and tools

① Oscilloscope
② Digital voltmeter
③ Alignment disk
④ FDD tester
⑤ Phillips screwdriver for M3
⑥ Screw lock adhesive

(2) Check procedure

1. Set up the oscilloscope referring to the steps in 3-9 "Check of tracking alignment", step 1.
2. Move the head to alignment check track 16 and check that a burst signal is received as shown in Fig. 305.
3. If the correct burst signal cannot be received, adjust as shown in "Adjustment".
4. Remove the alignment disk.
5. Connect the digital voltmeter or oscilloscope to TP10.
   Setting of oscilloscope: DC 1 V/div.
6. Start the DD motor and load the work media.
7. Check that the voltage at TP10 is as shown in the table when the head is moved to the specified position.

Track 00 ~ 01	Less than 0.5 V
Track 02 or subsequent tracks	More than 3.0 V

Table 307

   If the voltage at TP10 is not as specified in Table 307, adjust referring to "Adjustment".
8. Check that the voltage waveform at TP10 is not very much disturbed at HIGH-LOW switching when the head is repeatedly moved between tracks 00 and 04.

(3) Adjustment procedure

1. Connect the FDD tester with the tester connected, turn its power off once.
2. Connect the oscilloscope, referring to 3-9 "Check of tracking alignment", step 1.
3. Loosen the track 00 sensor mounting screw (Fig. 412) and fully move the track 00 sensor to the DD motor side.
4. Turn the FDD tester on, start the DD motor and load the alignment disk.
5. Repeat step in operation until burst signal waveform is observed (Fig. 305).
6. Fully move the track 00 sensor outward.
7. Step the head out by 15 tracks outward (track 01 position).
8. Measure the voltage at TP10 with digital voltmeter or oscilloscope.
9. Position the track 00 sensor so that the voltage at TP10 is "Low" level (less than 0.5 V).
10. Step the head in by 1 track (track 02 position).
11. Check that the voltage at TP10 is "High" level (more than 3 V).
12. If the correct voltage cannot be obtained, fine adjust the position of the track 00 sensor so that the voltage indicated in step 9 and 11 is obtained.
13. Tighten the mounting screw to the specified torque.

3-11. Check and Adjustment of Track 00 Stopper

When adjusting the tracking alignment or the track 00 sensor, be sure to check and adjust the track 00 stopper according to the following procedure:

(1) Measuring instruments and tools
   ① Pencil light (or flash light)
   ② FDD tester
   ③ Phillips screwdriver

(2) Check procedure
   1. Remove the three mounting screws and the one collar of the control PC board ass'y.
   2. Disconnect the two head connectors (PJ6), the front LED connector (PJ7) and the disk-in sensor connector (PJ5) from the control PC board ass'y and reverse the control PC board ass'y around 14-pin connector (PJ3). (See Fig.108)
   3. Move the head to track 00. In this condition, check that there is a very small clearance between the stepping motor pulley pin and the track 00 stopper (for F-502II/F-502LII Rev.A) or between the carriage ass'y and the track 00 stopper screw (for F-502LII Rev.B). (See Figs. 408 ~ 410)
   4. While directing the light of the pencil light (or flash light) onto the light receiver section (lower side) of the track 00 sensor, move the head outwards by one step (to track -01).
   5. Check that the stepping motor pulley pin or the head carriage (F-502LII Rev.B) touches the track 00 stopper with a sound after which it remains in contact with the stopper.
   6. As instructed in step 4, further more the head outwards by one steps (to track -02). At this time, check that the head carriage returns to its original position of track 00 with a very small clearance between the stepping motor pulley pin or the head carriage (for F-502LII Rev.B) and the track 00 stopper.
   7. Move the head inwards and outwards repeatedly between track 00 and the track located several tracks inside. At this time, check that no striking sound occurs between the stepping motor pulley pin or the head carriage (for F-502LII Rev.B) and track 00 stopper.
   8. Check by seeking track 39 that the pulley pin does not hit the track 00 stopper. (only F-502II/F-502LII Rev.A)
   9. When the requirements in step 3 ~ 8 are not met, adjust the track 00 stopper position according to the procedure in "Adjustment".

(3) Adjustment procedure
   1. Set the head to track 00.
   2. Loosen the mounting screw of the track 00 stopper. (only F-502II/F-502LII Rev.A)
   3. Adjust the stopper or stopper screw (F-502LII Rev.B) to the position at which there is a very small clearance between the pulley pin or the head carriage and stopper. Then, tighten the mounting screw of the stopper to the specified torque.
   4. Execute steps 3 ~ 8 in "Check".
   5. Attach the control PC board in the reverse procedure to that when detached.

3-12 Check and Adjustment of Index Burst Timing

When adjusting or replacing the following assemblies, be sure to check and adjust the index burst timing.

- O Head carriage ass'y
- O DD motor ass'y
- O Index sensor ass'y
- O Control PC board ass'y
- O Clamp base plate aas'y
- O Clamper ass'y

(1) Measuring instruments and tools
① Two channel oscilloscope
② Alignment disk
③ FDD tester
④ Phillips screwdriver for M2.5
⑤ Screw lock adhesive

(2) Check procedure
1. Connect the CH1 and CH2 terminals of the two channel oscilloscope to TP6 (index sensor output) and TP1 or TP2 (pre-amp output) on the control PC board respectively.
Setting of oscilloscope:
CH1: DC 2 V/div., 50 μsec/div.
CH2: AC 0.1 V/div., 50 μsec/div.
Trigger: CH1 at (+) trigger setting
2. Rotate the DD motor and load the alignment disk. It is assumed that the tracking alignment has been adjusted correctly in item 3-9.
3. Set the head to track 16.
4. Measure "t" as shown in Fig. 308.

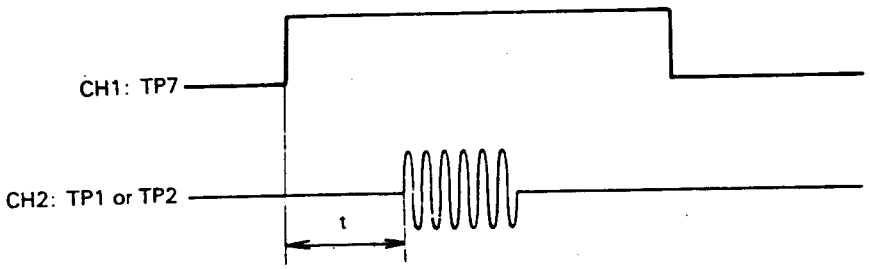


Fig. 308

5. Check that value of the index burst timing "t" is within the range shown below. If outside the range, adjust in accordance with the adjustment procedure.
Index burst timing"t" = 200μsec ±200μsec

(3) Adjustment procedure
1. Loosen the mounting screw of the index sensor, then adjust the position of the index sensor so that the value of the index burst timing is within the specified range in step 5 in "Check". See Figs. 408 ~ 410.
2. Tighten the mounting screw to the specified torque, and execute steps 3 ~ 5 in "Check".
3. Apply a small amount of screw lock adhesive to the head of the mounting screw.
4. Check by TP7 that the output voltage of the index sensor is normal. (No waveform split should occur at "High" level of more than 3.0 V or at "Low" level of less than 0.5 V.)
5. Remove the alignment disk.
Note: In this check and adjustment, take care not to allow string external light to strike the index sensor.

SECTION 4

Replacement Procedures

4-1. Replacement of Front Panel (For F-502II)

(1) Tools
① Phillips screwdriver for M3

(2) Replacement procedure
1. Lift the door lever (Fig. 408), then undo the lock.
(Set the door at raised position.)
2. Remove the two mounting screws (Fig. 412) of the front panel, then pull the panel out forward.
3. Install a new front panel in the reverse order to item 2.
4. Tighten the screws to a specified torque.

Note: 1 When installing the front panel, move the latch lever to the left so that the latch lever leaf spring is located at the left of the latch pin.
2 Install the front panel so that the LEDs are inserted into the holes in the front panel, and bond the LEDs.

4-2. Replacement of Front Lever and Front Panel (For F-502LII)

(1) Tools
① Phillips screwdriver for M3

(2) Replacement procedure
1. Remove the front lever by loosening the mounting screw (Rev.A) or pulling it out (Rev.B).
2. Remove the two mounting screws of the front panel, then pull the panel out forward. (See Fig. 412)
3. Install a new front panel in the reverse procedure.
4. Tighten the screws to a specified torque.
5. Insert a new front lever onto the front lever shaft and tighten the screw.

4-3. Replacement of Control PC Board Ass'y

(1) Tools and measuring instruments
① Phillips screwdriver for M3
② Tools, measuring instruments, etc. specified in reference items

(2) Replacement procedure
1. Remove the three mounting screws and the one collar (only F-502II/F-502LII Rev.A) of the control PC board ass'y, then remove the ass'y.
2. Disconnect the two head connectors (PJ6), front LED connector (PJ7), DD motor connector (PJ4) and 14-pin connector (PJ3) from the control PC board. (See Fig. 108)
3. Mount the new control PC board ass'y in the reverse procedure.
When inserting the head connector, check the connection of head connectors S0 and S1 referring to the indications of the control PC board. (See Fig. 105)

4. Check and adjust the asymmetry in accordance with item 3-7.
5. Check the read level and the resolution in accordance with item 3-8.
6. Check and adjust the index burst timing in accordance with item 3-12.

4-4. Replacement of Clamp Base Plate Ass'y (For F-502II)

(1) Tools
① Phillips screwdriver for M2.5
② Screw lock adhesive
③ Tweezers
④ Tools, etc. specified in reference items.

(2) Replacement procedure
1. Lift the door lever (Fig. 408), then undo the lock.
(Set the door at raised position.)
2. Remove the two mounting screws (Fig. 412) of the front panel, then pull the panel out forward.
3. Remove the mounting screw (Fig. 408) of the write protect sensor ass'y, then remove it.
4. Remove the mounting screw (Fig. 408) of the index sensor ass'y, then remove the index sensor from the clamp base plate ass'y.
5. Remove the control PC board ass'y referring to item 4-3.
6. Move the head carriage ass'y outwards with the fingers.
7. To prevent short circuit, insert a sheet of paper between side 0 and 1 heads.
8. Remove five mounting screws from the clamp base plate ass'y and remove the front LED ass'y, disk-in sensor ass'y and clamp base plate ass'y. (At this time, take care not to raise head arm.)
9. Remove the clamper ass'y from the clamp base plate ass'y.
10. Mount the new clamp base plate ass'y in the reverse procedure. For mounting the control PC board ass'y, write protect sensor ass'y and index sensor ass'y follow items 4-3, 4-11 and 4-12.
When attaching the clamper ass'y to the clamp base plate ass'y, set the clamper shaft washer between the clamp lever and the E-ring. (Fig. 402)
11. Install the front panel referring to item 4-1. (At that time, adjust the position of the front LED ass'y so that the front LED is correctly inserted into the front panel.)
12. Tighten the screws to a specified torque and apply screw lock.
13. Adjust the position of the veil in accordance with item 3-1.
14. Check the write protect sensor referring to item 3-3.
15. Check the disk-in sensor in accordance with item 3-4.
16. Adjust the position of the clamp support plate in accordance with item 3-2.
17. Check and adjust the index burst timing in accordance with item 3-12.

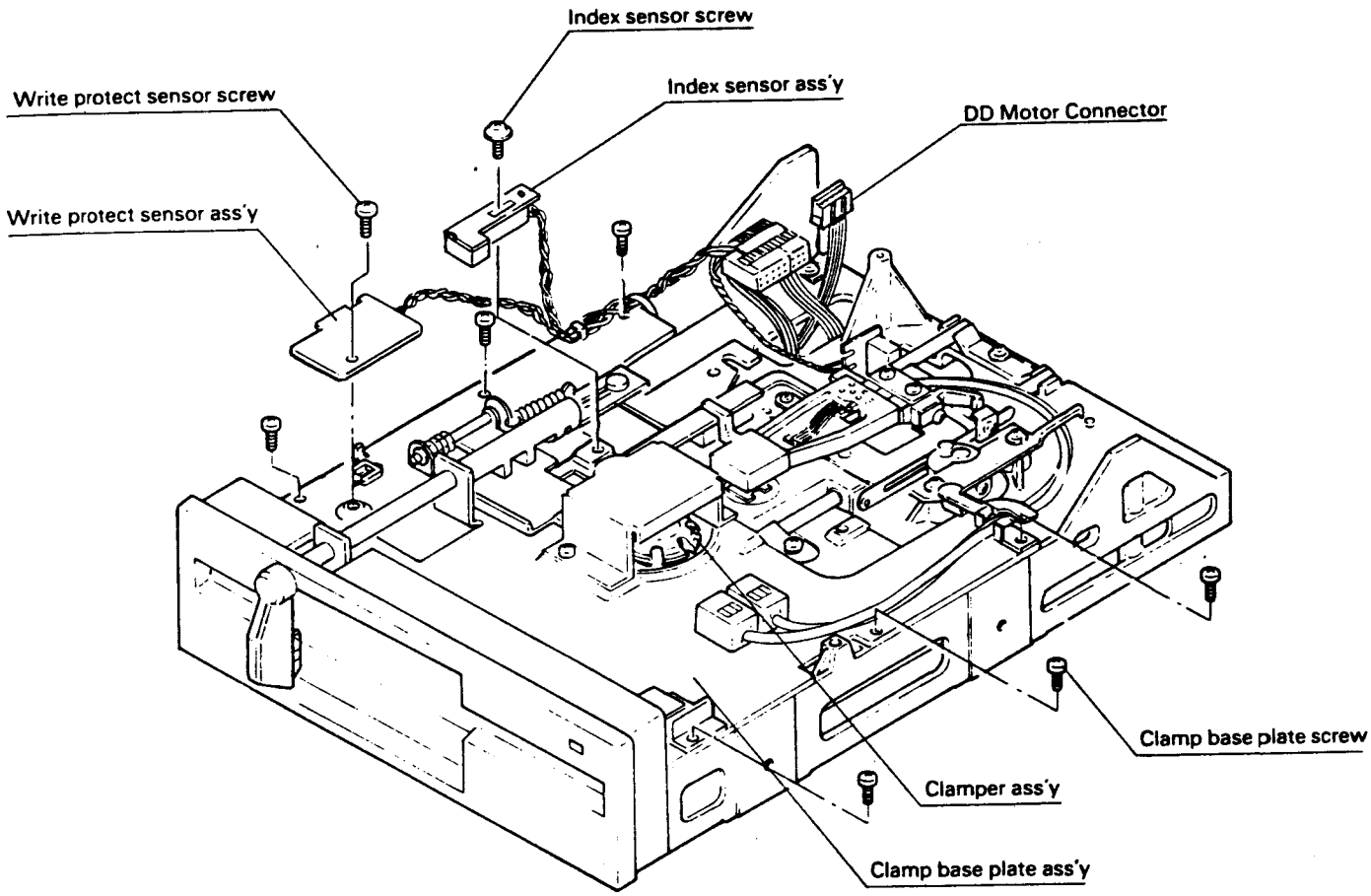


Fig. 401

4-5. Replacement of Clamp Base Plate Ass'y (For F-502LII)

(1) Tools
- ① Phillips screwdriver for M2.5
- ② Screw lock adhesive
- ③ Tweezers
- ④ Tools, etc. specified in reference items.

(2) Replacement procedure
1. Remove the front lever and front panel referring to item 4-2.
2. Remove the mounting screw of index sensor ass'y, then remove it.
3. Remove the mounting screw of write protect sensor ass'y, then remove the write protect sensor ass'y and WP socket.
4. Remove the control PC board ass'y referring to item 4-3.
5. Move the head carriage ass'y outwards with fingers.

6. Remove the five mounting screws from the clamp base plate ass'y and remove the front LED ass'y, disk-in sensor ass'y (only Rev.A type) and clamp base plate ass'y. (At that time, take care not to raise head arm and insert paper sheet between head side 0 and 1 to protect the head against scratches.)
7. Mount the new clamp base plate ass'y in the reverse procedure. For mounting the control PC board ass'y, write protect sensor ass'y and index sensor ass'y follow items 4-3, 4-11 and 4-12.
8. Install the front panel and front lever referring to item 4-2. (At that time, adjust the position of the front LED ass'y so that the front LED is correctly inserted into the front panel.)
9. Tighten the screws to a specified torque and apply screw lock.
10. Check the write protect sensor referring to item 3-3.
11. Check the disk-in sensor in accordance with item 3-4.
12. Adjust the position of the clamp support plate in accordance with item 3-2. (only Rev.A type)
13. Check and adjust the index burst timing in accordance with item 3-12.

4-6. Replacement of Clamper Ass'y (For F-502II)

(1) Tools
① Phillips screwdriver for M2.5
② Tweezers
③ Screw lock adhesive
④ Tools, etc. specified in reference items

(2) Replacement procedure
1. Remove the front panel in accordance with item 4-1.
2. Remove the control PC board ass'y in accordance with item 4-3.
3. To prevent short circuit, insert a sheet of paper between side 0 and 1 heads.
4. Remove the five mounting screw of the clamp base plate ass'y, take the clamp base plate ass'y out of the frame, then turn it over. (Fig. 403)
(At this time, take care not to lift up the head arm.)
5. Remove the clamper ass'y from the clamp base plate ass'y.
6. Mount the new clamper ass'y in the reverse procedure. Set the clamper shaft washer between the clamp lever and the E-ring. (Fig. 402)
7. When installing the front panel, be sure to move the latch lever to the left.
8. Tighten each mounting screw to the specified torque, and apply a smoll amount of screw lock adhesive to its head.
9. Adjust the position of the clamp support plate in accordance with item 3-2.
10. Check and adjust the tracking alignment in accordance with item 3-9.
11. Check and adjust the index burst timing in accordance with item 3-12.

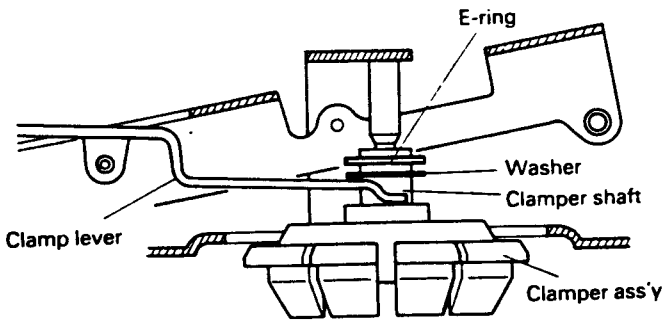


Fig. 402

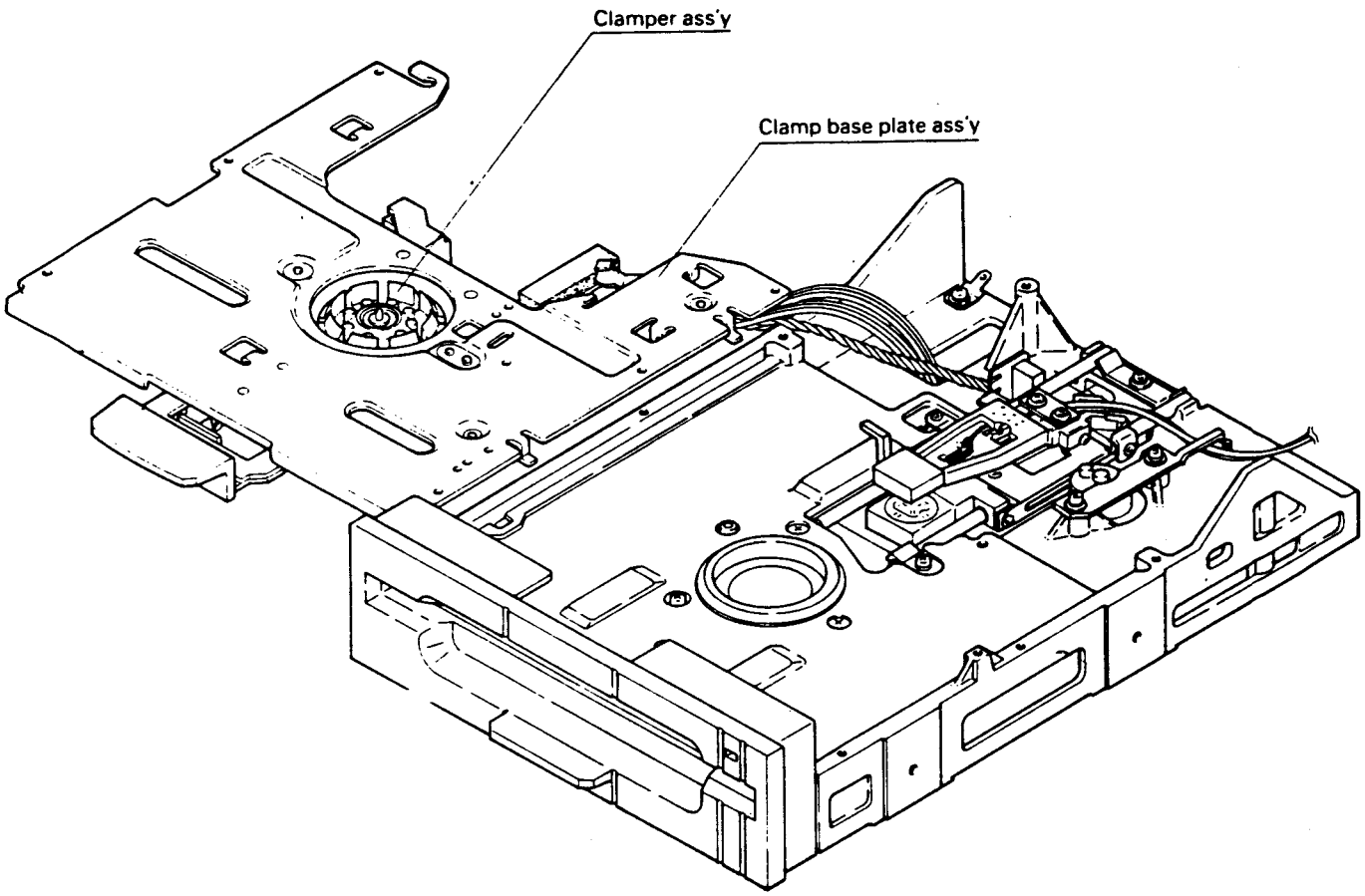


Fig. 403

4-7. Replacement of Clamper Ass'y (For F-502LII)

(1) Tools

① Phillips screwdriver for M2.5

(2) Replacement procedure

(Rev.A type)

1. Remove the two mounting screws of the clamp support plate, then remove it.
2. Remove the clamper ass'y from the clamp base plate ass'y.
3. Mounting the new clamper ass'y in the reverse procedure.
4. Adjust the position of the clamp support plate in accordance with item 3-2

(Rev.B type)

1. Remove the E-ring of clamper ass'y, then remove the clamper ass'y.
2. Mount the new clamper ass'y in the reverse procedure.

4-8. Replacement of DD (Spindle) Motor Ass'y

(1) Tools

① Phillips screwdriver for M3
② Tweezers
③ Screw lock adhesive
④ Tools, measuring instruments, etc. specified in reference items

(2) Replacement procedure

1. Remove the clamp base plate ass'y in accordance with items 4-4,4-5.
2. Remove the three mounting screws of the DD motor, then draw the DD motor out from its rotor side. (See Fig. 411)
3. Mount the new DD motor in the reverse procedure.
4. Adjust position of the clamp support plate in accordance with item 3-2.
5. Check the write protect sensor in accordance with item 3-3.
6. Check the disk-in sensor in accordance with item 3-4.
7. Check and adjust the disk rotating speed in accordance with item 3-5.
8. Check and adjust the tracking alignment in accordance with item 3-9.
9. Check and adjust the index burst timing in accordance with item 3-12.

4-9. Replacement of Head Carriage Ass'y

(1) Tools

① Phillips screwdriver for M3
② Phillips screwdriver for M2.5
③ Small Phillips screwdriver (No. 0 bit)
④ Tweezers
⑤ Pure alcohol or Daiflon
⑥ Screw lock adhesive
⑦ Pliers
⑧ FDD tester
⑨ Tools, measuring instruments, etc. specified in reference items

(2) Replacement procedure

1. Remove the control PC board ass'y in accordance with item 4-3.
2. Remove the two mounting screws of track 00 stopper, then take it out. (only F-502II/F-502LII Rev.A)
3. Move the head carriage ass'y outwards with the fingers, remove the screw of the steel belt retainer, then take out the steel belt retainer. (See Fig. 404)
4. Remove the screw of the pulley, then take out the washer of the pulley.
5. Draw out the steel belt.
6. Remove the three mounting screws of rail retainers A and B, then take the retainers out.
7. Remove the head carriage ass'y with the two rails attached to the carriage.
   NOTE: When the rails are dirty, clean them with pure alcohol or daiflon.
8. Mount the new head carriage ass'y in the reverse procedure to that in steps 6 and 7 above. Tighten its mounting screws to the specified torque.
9. Apply a small amount of silicone oil to the rails.
10. Adjust the track 00 stopper so that it does not come into contact with the pulley pin at track 00 and track 39. (only F-502II/F-502LII Rev.A)

11. Attach the head cable to the clamp base plate in the reverse order to removal.
12. Connect each connector, such as the head connectors, to the control PC board ass'y referring to Fig. 108.
13. Install the control PC board ass'y.
14. Connect the FDD tester, and load the work disk.
15. Rotating the DD motor, repeatedly seek between track 00 and 39 for 10 minutes.
16. Check and adjust the tracking alignment in accordance with item 3-9.
17. Check and adjust the track 00 sensor in accordance with item 3-10.
18. Check and adjust the track 00 stopper in accordance with item 3-11.
19. Check and adjust the index burst timing in accordance with item 3-12.
20. Check the head for touching with the disk in accordance with item 3-6.
21. Check and adjust the asymmetry in accordance with item 3-7.
22. Check the read level and the resolution in accordance with item 3-8.

4-10. Replacement of Stepping Motor Ass'y

(1) Tool

① Phillips screwdriver for M3
② Phillips screwdriver for M2.5.
③ Small Phillips screwdriver (No. 0 bit).
④ Tweezers.
⑤ Pure alcohol or Daiflon.
⑥ Screw lock adhesive.
⑦ FDD tester
⑧ Tools, measuring instruments, etc. specified in reference items

(2) Replacement procedure

1. Remove the control PC board ass'y in accordance with item 4-3.
2. Remove the two mounting screws of the track 00 stopper, then take the stopper out. (only F-502II/F-502LII Rev.A)
3. Move the head carriage ass'y outwards with the fingers, remove the screw of the steel belt retainer and take out the steel belt retainer.
4. Remove the screw of the pulley, and take out the washer of the pulley.
5. Draw out the steel belt.
6. Remove the 6-pin connector housing of the stepping motor from the 14-pin connector housing. Disengage the stepping motor cables from the wire holder.
7. Remove the mounting screw of shield plate D and mounting screw B of the stepping motor, then take out shield plate D. (See Fig. 412)
8. Remove the mounting screw A of the stepping motor, then pull it out of the frame.
9. Mount the new stepping motor in the reverse procedure to that in step 6 ~ 8 above. After checking that the lower section of the stepping motor completely engages the frame holes, temporarily tighten mounting screws A and B. Attach the wire holder by the shield plate D mounting screw as before.
10. Clean the steel belt with pure alcohol or daiflon. When it is damaged, use a new one.
11. Wind the steel belt around the pulley in a loop as shown in Fig. 404.

12. Put the circular washer section of the steel belt on the shaft of the belt plate, then secure the steel belt by the steel belt retainer and the steel belt retainer screw. At this time, tighten the steel belt retainer screw temporarily.
13. Position the pulley and head carriage ass'y correctly, and attach the pulley washer by the pulley screw. Tighten the pulley screw so that there is a clearance of about 0.5mm between the pulley washer and the pulley. (See Fig. 405.)
14. Pull section A of the steel belt with pliers with a force of about 1 kg-cm rearwards straightly, then tighten the steel belt retainer screw.
15. Tighten the pulley screw.
16. Slightly push the belt with the tweezers from the top and bottom to check that the belt tension is uniform.
17. Move the head carriage ass'y outwards and inwards with fingers several times to check that the steel belt does not strike on itself.
18. When some fault occurs in steps 16 ~ 17, when the motion of the head carriage ass'y is not smooth, the belt is mounted incorrectly. Therefore, loosen the steel belt retainer screw and the pulley screw and repeat steps 14 ~ 17.
19. Apply a small amount of screw lock adhesive to the steel belt retainer screw and the pulley screw.
20. Adjust the track 00 stopper so that it does not come into contact with the pulley pin at track 00 and track 39 and temporarily fix the stopper. (only F-502II/F-502LII Rev.A)
21. Connect the each connector, such as the head connectors, to the control PC board ass'y referring to Fig. 108.
22. Install the control PC board ass'y.
23. Connect the FDD tester and load the work disk.
24. Rotating the DD motor, repeatedly seek between track 00 and track 39 for 10 minutes.
25. Check and adjust the tracking alignment in accordance with item 3-9.
26. Check and adjust the track 00 sensor in accordance with item 3-10.
27. Check and adjust the track 00 stopper in accordance with item 3-11.

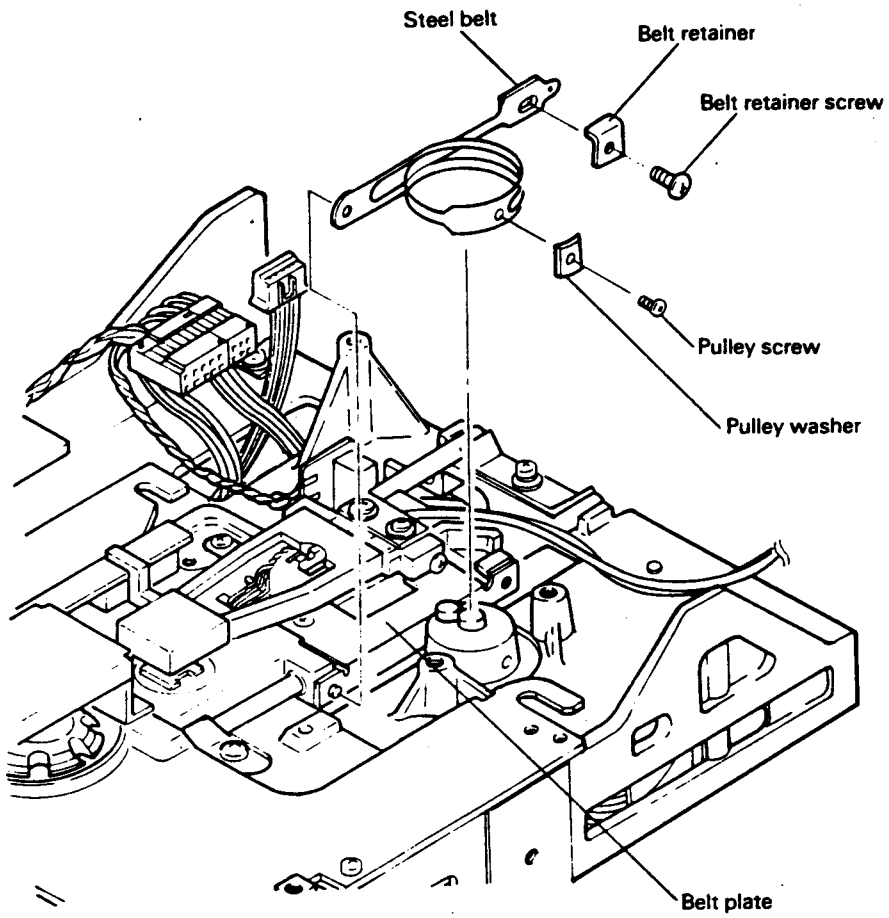


Fig. 404

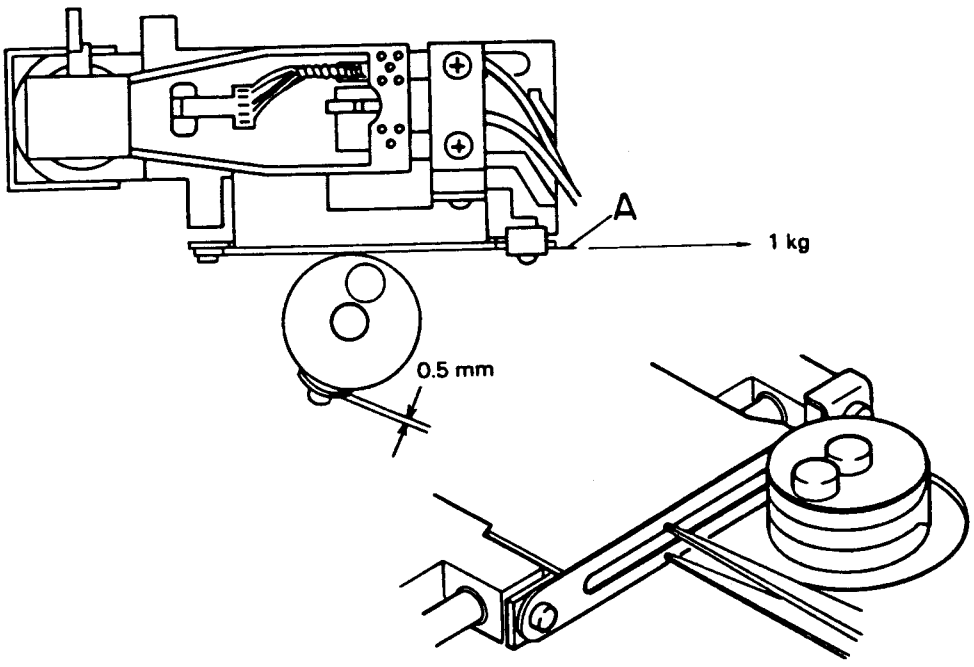


Fig. 405

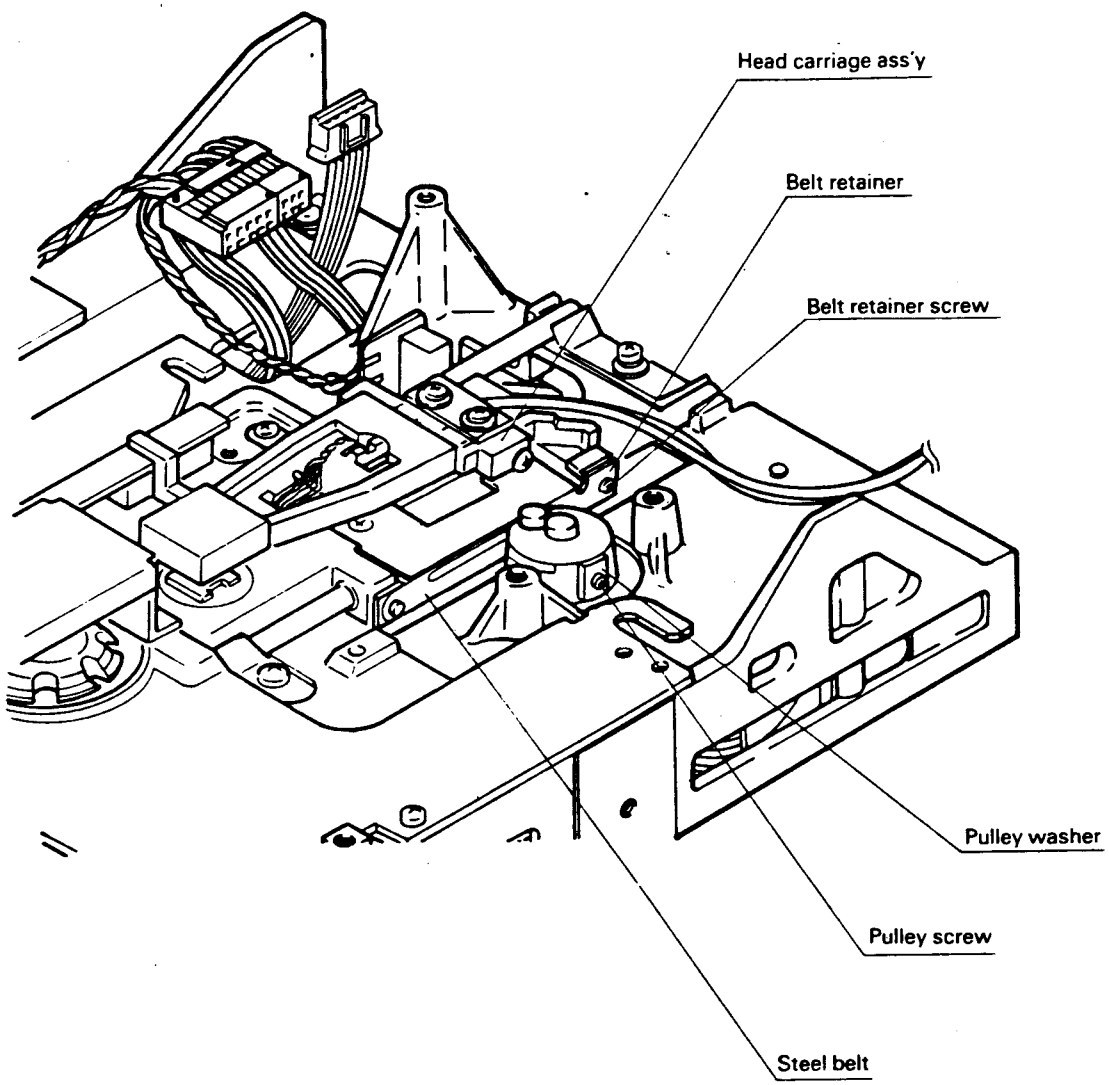

Head carriage ass'y
Belt retainer
Belt retainer screw
Pulley washer
Pulley screw
Steel belt

Fig. 406

4-11. Replacement of Write Protect Sensor Ass'y

(1) Tools
  ① Phillips screwdriver for M2.5
  ② Tweezers

(2) Replacement procedure
  1. Disconnect the 14-pin connector (PJ4) from the control PC board ass'y.
  2. Draw out the two connector pins of write protect sensor ass'y from the housing in accordance with (4) "Drawing out of connector pins" in item 1-2-2.
  3. Release the sensor cable from clamp base plate ass'y.
  4. Remove the mounting screw of the write protect sensor ass'y, then take the sensor out.
  5. Mount the new write protect sensor ass'y in reverse procedure. Then, set the sensor in the square hole of the WP socket and connect the yellow lead wire of the sensor to pin 2 and the black lead wire to pin 1. (See step (5) in item 1-2-2.)
  6. Check the write protect sensor in accordance with item 3-3.

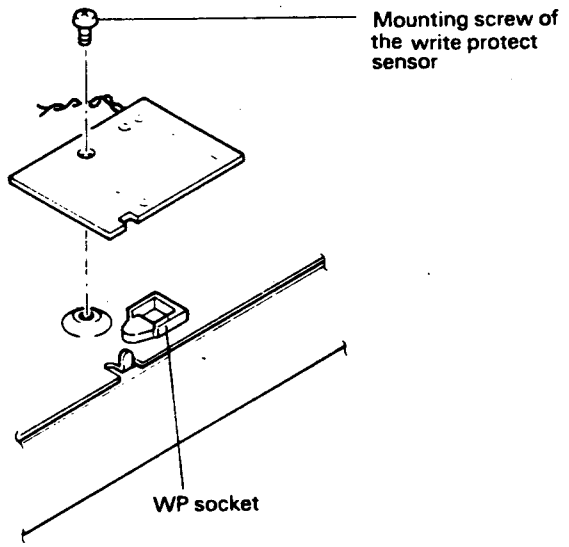


Fig. 407

4-12. Replacement of Index Sensor Ass'y

(1) Tools
① Phillips screwdriver for M2.5
② Tweezers

(2) Replacement procedure
1. Disconnect the 14-pin connector (PJ4) from the control PC board ass'y.
2. Draw out the two connector pins of index sensor ass'y from the housing in accordance with (4) "Drawing out of connector pins" in item 1-2-2.
3. Remove the mounting screw of the index sensor ass'y, then take the sensor out.
4. Mount the new index sensor ass'y in reverse procedure. Then, connect the white lead wire of sensor to pin 3 and the orange lead wire to pin 4. (See step (5) in item 1-2-2.)
5. Check and adjust the index burst timing in accordance with item 3-12.

4-13. Replacement of Track 00 Sensor Ass'y

(1) Tools
① Phillips screwdriver for M3
② Tweezers

(2) Replacement procedure
1. Disconnect the 14-pin connector (PJ4) from the control PC board ass'y.
2. Draw out the three connector pins of track 00 sensor ass'y from the housing in accordance with (4) "Drawing out of connector pins" in item 1-2-2.
3. Remove the mounting screw of the track 00 sensor ass'y, then take the sensor out.
4. Mount the new track 00 sensor ass'y in the reverse procedure. Then, connect the blue lead wire of sensor to pin 5, the red lead wire to pin 6 and the green lead wire to pin 8. (See step (5) in item 1-2-2.)
5. Check and adjust the track 00 sensor in accordance with item 3-10.

4-14. Replacement of Disk-in Sensor Ass'y

(1) Tools
① Phillips screwdriver for M3

(2) Replacement procedure
1. Remove the control PC board ass'y in accordance with item 4-3.
2. Disconnect the disk-in sensor connector from the control PC board ass'y.
3. Release the head cable from the clamp base plate ass'y. (only F-502II/F-502LII Rev.A)
4. Remove the mounting screw of the disk-in sensor ass'y, then take the sensor out.
5. Mount the new disk-in sensor ass'y in reverse procedure.
6. Check the disk-in sensor in accordance with item 3-4.

F-502II

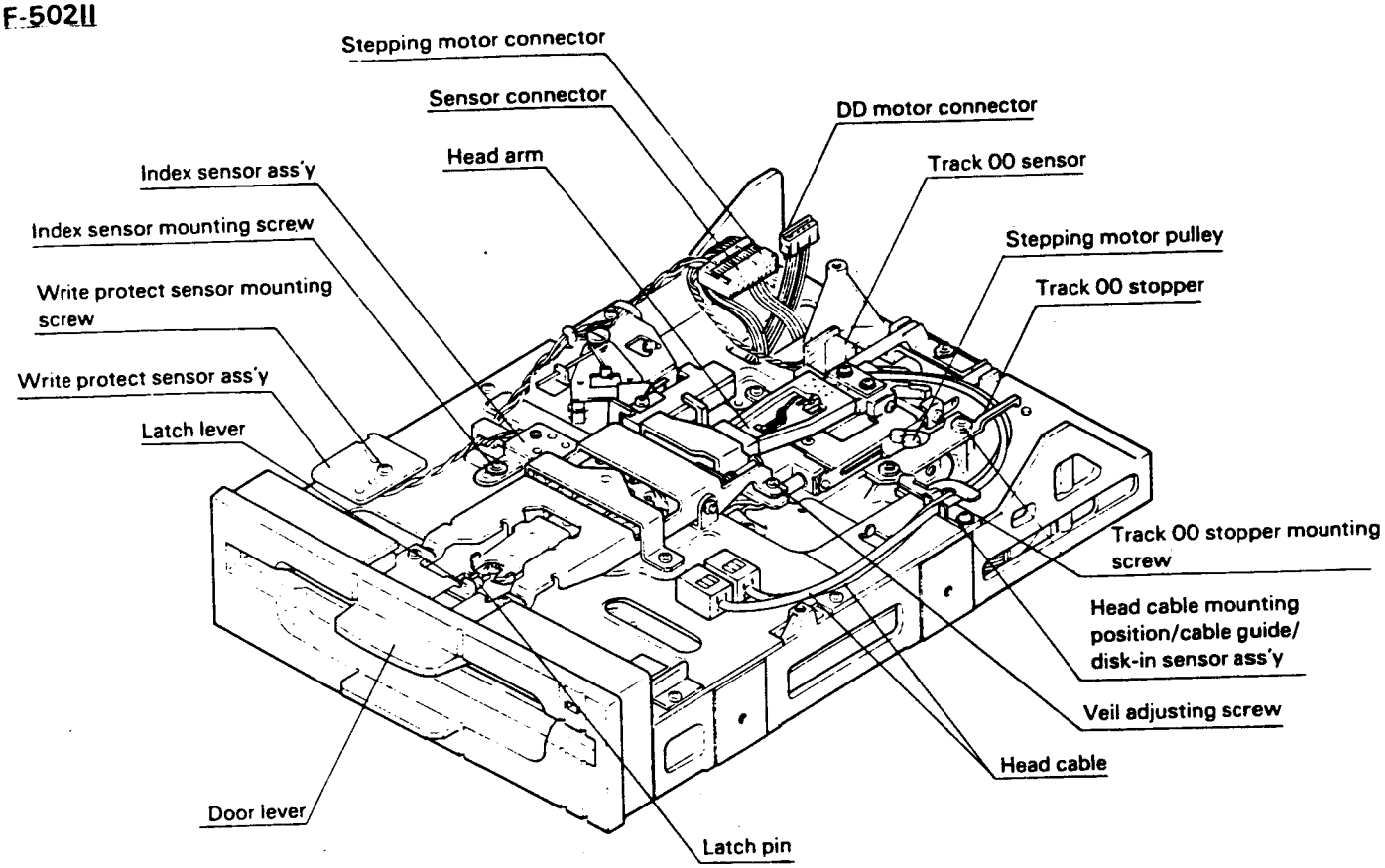


Fig. 408

F-502LII Rev.A

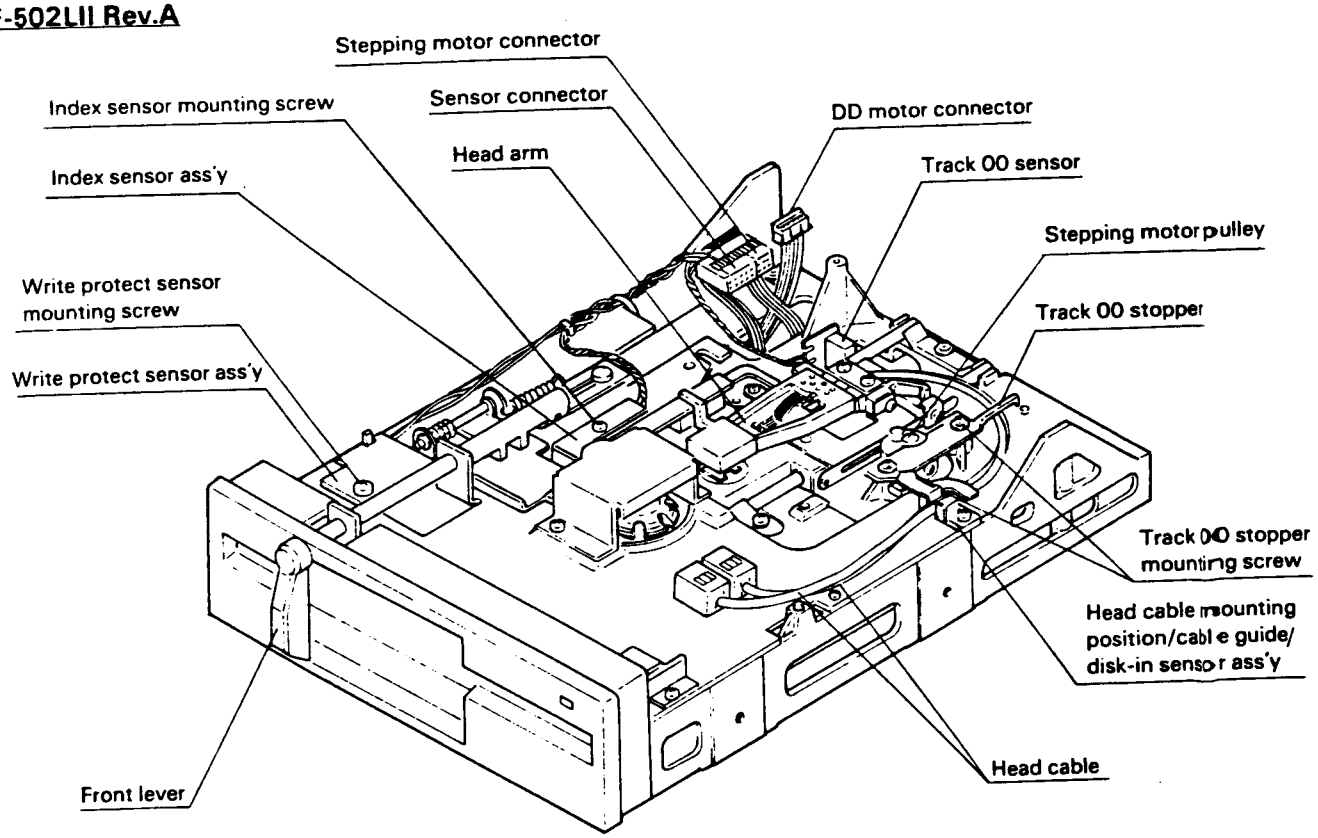


Fig. 409

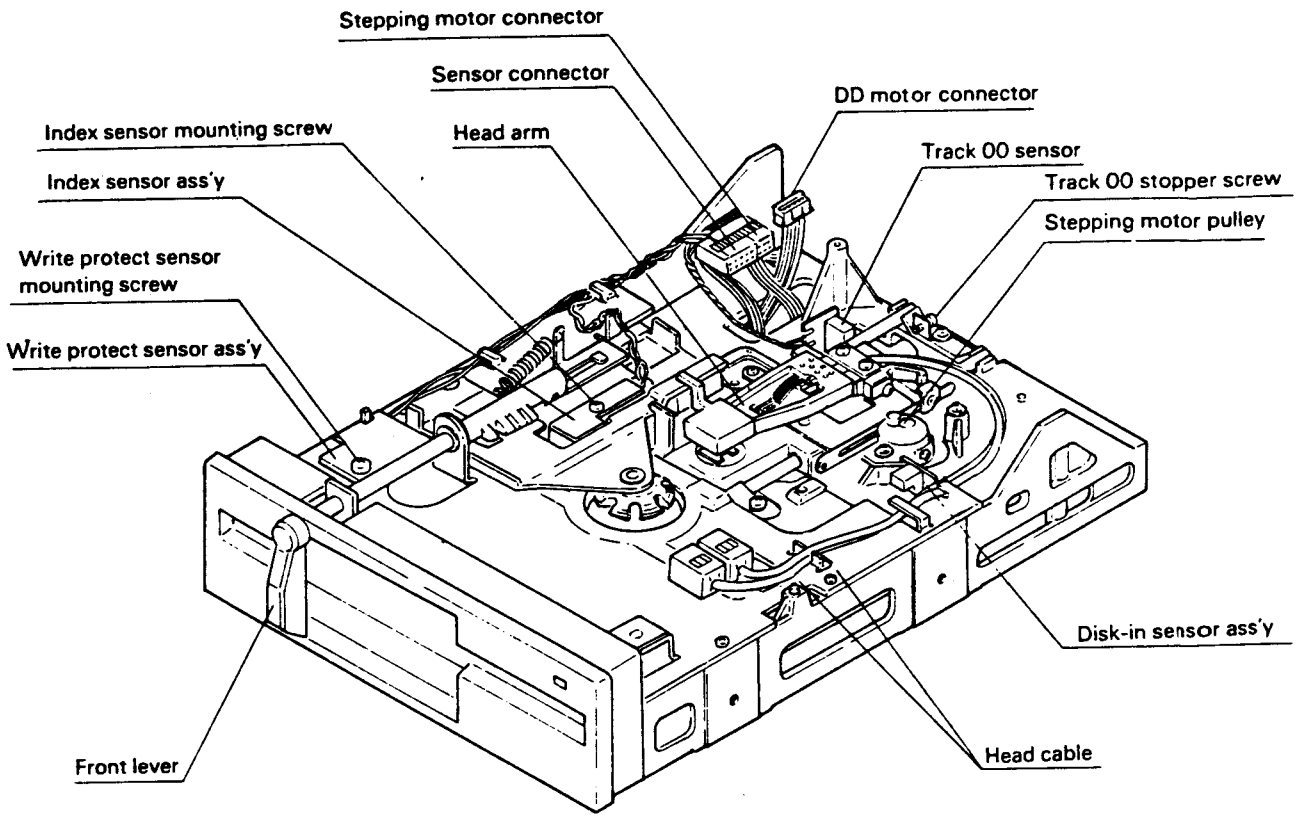


Fig. 410

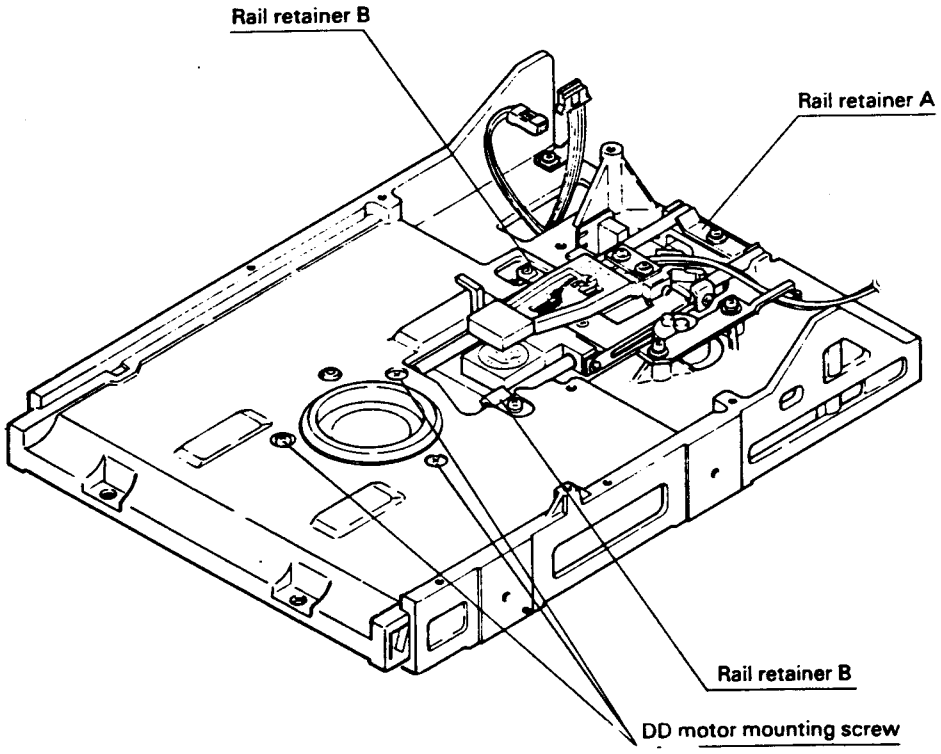


Fig. 411

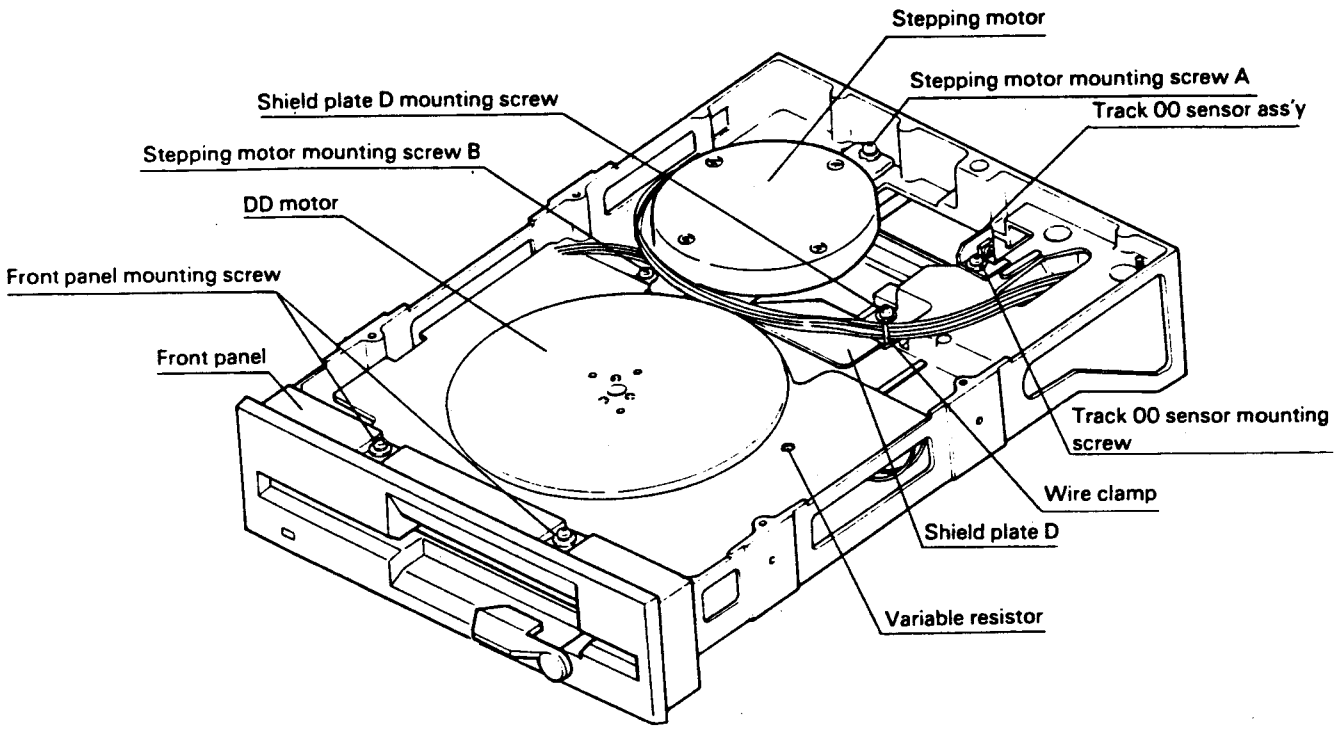

Stepping motor
Stepping motor mounting screw A
Track 00 sensor ass'y
Shield plate D mounting screw
Stepping motor mounting screw B
DD motor
Front panel mounting screw
Front panel
Track 00 sensor mounting screw
Wire clamp
Shield plate D
Variable resistor

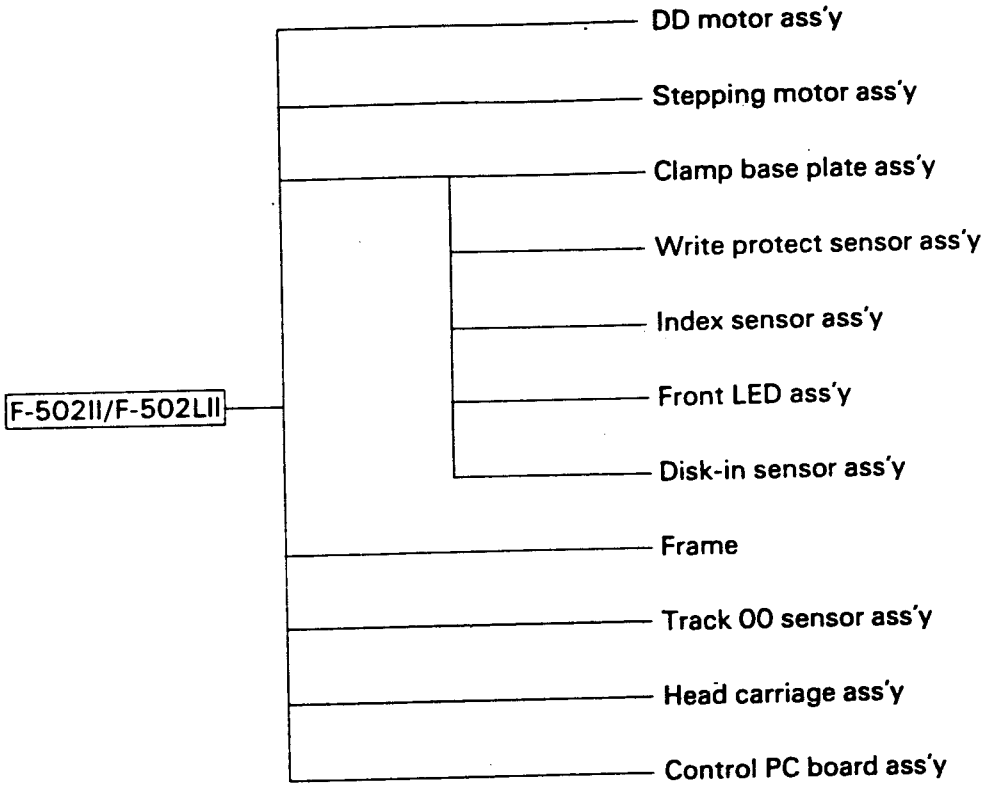
Fig. 412

SECTION 5

Parts Information

5-1. Construction

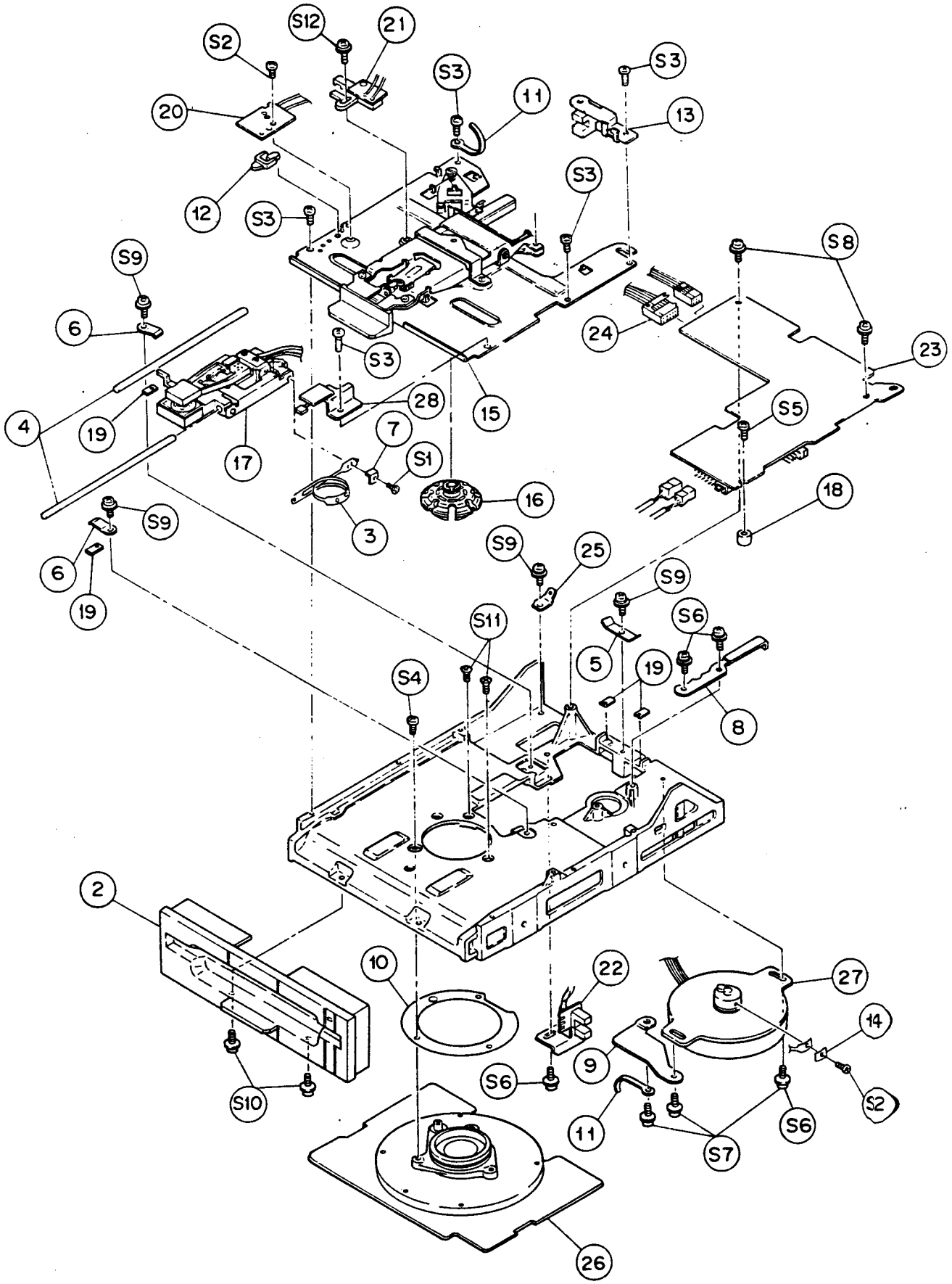
The components of the F-502II/F-502LII are shown below.



5-2. Mechanism Parts List and Exploded View of F-502II

NO.	PARTS NO.	DESCRIPTION	QTY	REMARKS
2	051F1JC-1003A	FRONT PANEL	1	
3	051F1JC-1053A	STEEL BELT	1	
4	051F1JC-1057A	RAIL	2	
5	051F1JC-1058A	RAIL RETAINER A	1	
6	051F1JC-1059A	RAIL RETAINER B	2	
7	051F1JC-1062A	STEEL BELT RETAINER	1	
8	056F1JC-1063A	TRACK 00 STOPPER	1	
9	051F1JC-1069A	SHIELD PLATE D	1	
10	051F1JC-1072A	P-ADJUSTMENT PLATE	1	ADJ.PARTS
11	051F1JC-1076A	WIRE HOLDER	2	
12	056F1JC-1079A	WP SOCKET	1	
13	068F1JCSEP02A	DISK-IN SENSOR ASS'Y	1	
14	051F1JC-1084A	PULLEY WASHER	1	
15	056F1JCS1005A	CLAMP BASE PLATE ASS'Y	1	
16	051F1JCS1022A	CLAMPER ASS'Y	1	
17	056F1JCS1051A	HEAD CARRIAGE ASS'Y	1	
18	056F1JC-1100A	PCB COLLAR	1	
19	056F1JC-1104A	P-WASHER	4	ADJ. PARTS
20	051F1JCSEP03B	W/P SENSOR ASS'Y	1	
21	056F1JCSEP02B	INDEX SENSOR ASS'Y	1	
22	051F1JCSEP04B	TRACK 00 SENSOR ASS'Y	1	
23	078F5JCSEP01A	CONTROL PCB ASS'Y	1	
24	051F1JCSW02A	8 PIN CONNECTOR HOUSING	1	
25	EJ0008-01MS	FASTEN TERMINAL	1	
26	078F5JC-EM01A	DD MOTOR ASS'Y	1	
27	078F5JC-EM02A	STEPPING MOTOR ASS'Y	1	
28	068F1JCSEP03A	FRONT LED ASS'Y	1	
S-1	112-30714	SCREW 2 × 3	1	
S-2	SPNZ25-03042	SCREW 2.5 × 3	2	
S-3	SPNZ25-05042	SCREW 2.5 × 5	5	
S-4	SPNZ30-05042	SCERW 3 × 5	1	
S-5	SPNZ30-10042	SCREW 3 × 10	1	
S-6	SENB30-06042-3	SCREW 3 × 6 × 8 WS	4	
S-7	SENB30-08042-3	SCREW 3 × 8 × 8 WS	2	
S-8	SENB30-06042	SCREW 3 × 6 S	2	
S-9	SENA30-06042	SCREW 3 × 6 S	4	
S-10	SENF30-08042-3	SCREW 3 × 8 × 8 S	2	
S-11	SPSZ30-06042	SCREW 3 × 6	2	
S-12	SENF20-08042	SCREW 2 × 8 × 5 S	1	
S-13	SG2[illegible]0-08014	SCREW 3 × 8	1	

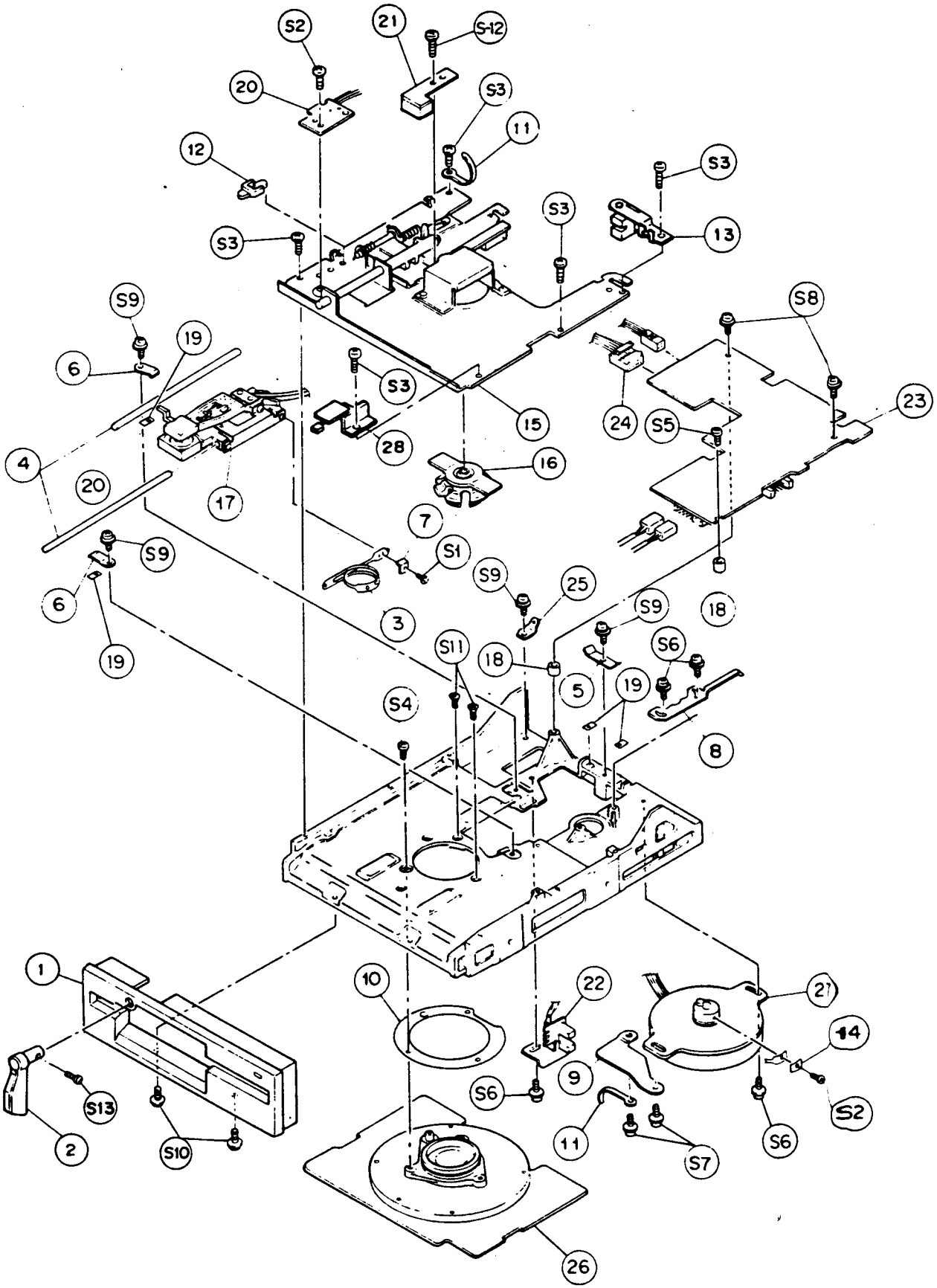
Mechanism Exploded View of F-502II



5-3. Mechanism Parts List and Exploded View of F-502LII (Rev.A)

NO.	PARTS NO.	DESCRIPTION	QTY	REMARKS
1	077F1JC-1001A	FRONT PANEL (BLACK)	1	
1	080F3JC-1001A	FRONT PANEL (BEIGE)	1	
2	077F1JC-1002A	FRONT LEVER (BLACK)	1	
2	080F3JC-1002A	FRONT LEVER (BEIGE)	1	
3	051F1JC-1053A	STEEL BELT	1	
4	051F1JC-1057A	RAIL	2	
5	051F1JC-1058A	RAIL RETAINER A	1	
6	051F1JC-1059A	RAIL RETAINER B	2	
7	051F1JC-1062A	STEEL BELT RETAINER	1	
8	078F5JC-1063A	TRACK 00 STOPPER	1	
9	051F1JC-1069A	SHIELD PLATE D	1	
10	051F1JC-1072A	P-ADJUSTMENT PLATE	1	ADJ. PARTS
11	051F1JC-1076A	WIRE HOLDER	2	
12	056F1JC-1079A	WP SOCKET	1	
13	068F1JCSEP02A	DISK-IN SENSOR ASS'Y	1	
14	051F1JC-1084A	PULLEY WASHER	1	
15	078F1JCS1008A	CLAMP BASE PLATE ASS'Y	1	
16	077F1JCU1020A	CLAMPER ASS'Y	1	
17	078F5JCS1051A	HEAD CARRIAGE ASS'Y	1	
18	056F1JC-1100A	PCB COLLAR	1	
19	056F1JC-1104A	P-WASHER	4	ADJ. PARTS
20	077F1JCSEP02A	W/P SENSOR ASS'Y	1	
21	077F1JCSEP01A	INDEX SENSOR ASS'Y	1	
22	051F1JCSEP04B	TRACK 00 SENSOR ASS'Y	1	
23	078F1JCSEP01A	CONTROL PCB ASS'Y	1	
24	051F1JCSW02A	8 PIN CONNECTOR HOUSING	1	
25	EJ0008-01MS	FASTEN TERMINAL	1	
26	078F5JC-EM01A	DD MOTOR ASS'Y	1	
27	078F5JC-EM02A	STEPPING MOTOR ASS'Y	1	
28	068F1JCSEP03A	FRONT LED ASS'Y	1	
S-1	112-30714	SCREW 2 × 3	1	
S-2	SPNZ25-03042	SCREW 2.5 × 3	2	
S-3	SPNZ25-05042	SCREW 2.5 × 5	5	
S-4	SPNZ30-05042	SCREW 3 × 5	1	
S-5	SPNZ30-10042	SCREW 3 × 10	1	
S-6	SENB30-06042-3	SCREW 3 × 6 × 8 WS	4	
S-7	SENB30-08042-3	SCREW 3 × 8 × 8 WS	2	
S-8	SENB30-06042	SCREW 3 × 6S	2	
S-9	SENA30-06042	SCREW 3 × 6 S	4	
S-10	SENF30-08042-3	SCREW 3 × 8 × 8 S	2	
S-11	SPSZ30-06042	SCREW 3 × 6	2	
S-12	SENF20-08042	SCREW 2 × 8 × 5 S	1	
S-13	STN220-08014	SCREW 2 × 8	1	

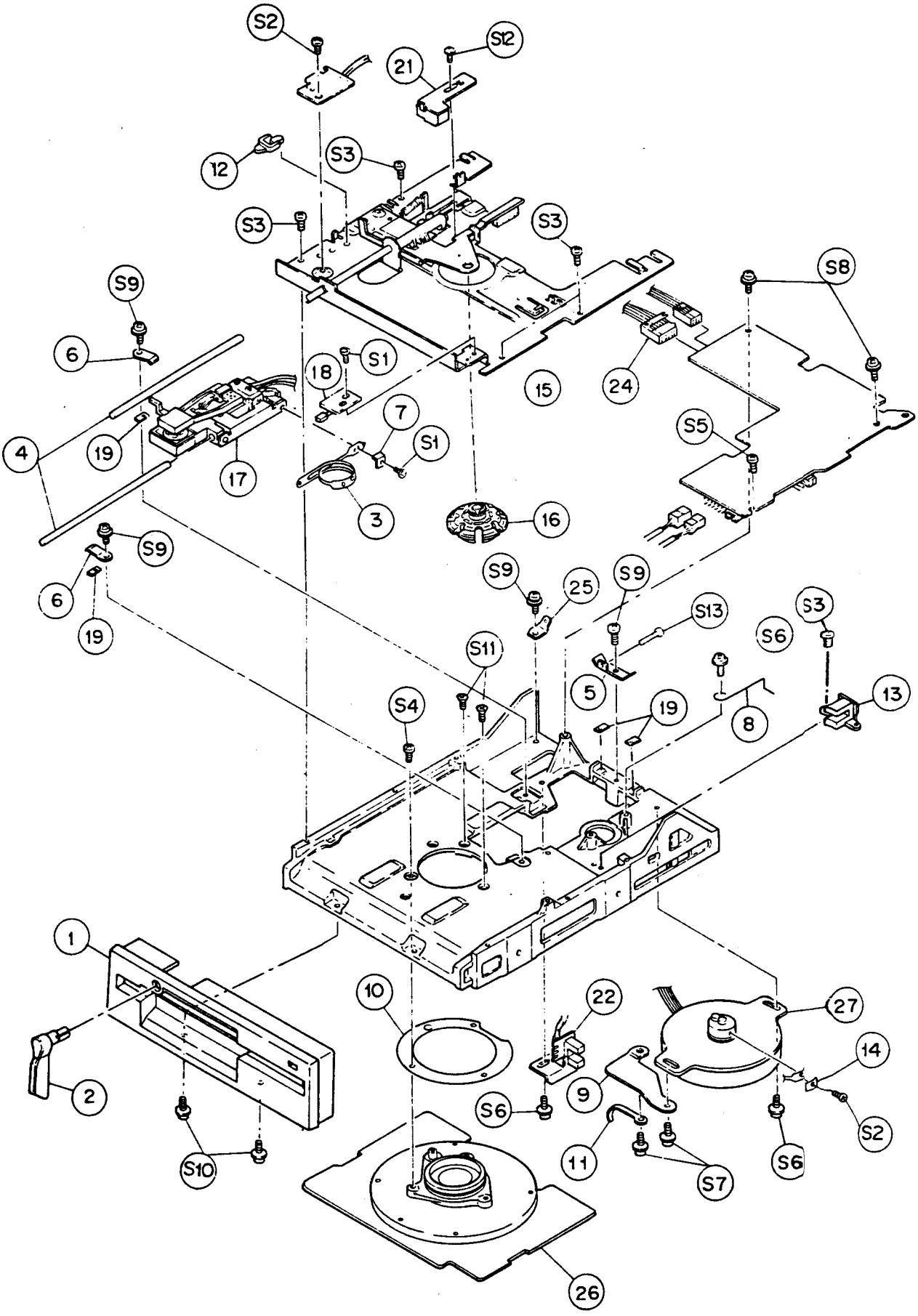
Mechanism Exploded View of F-502LII (Rev.A)



5-4. Mechanism Parts List and Exploded View of F-502LII (Rev.B)

NO.	PARTS NO.	DESCRIPTION	QTY	REMARKS
1	077F1JC-1001A	FRONT PANEL (BLACK)	1	
1	080F3JC-1001A	FRONT PANEL (BEIGE)	1	
2	078F7JC-1007A	FRONT LEVER (BLACK)	1	
2	078F8JC-1007A	FRONT LEVER (BEIGE)	1	
3	051F1JC-1053A	STEEL BELT	1	
4	051F1JC-1057A	RAIL	2	
5	078F7JC-1015A	RAIL RETAINER A	1	
6	078F7JC-1016A	RAIL RETAINER B	2	
7	078F7JC-1013A	STEEL BELT RETAINER	1	
8	078F7JC-1013A	SHIELD WIRE HOLDER	1	
9	051F1JC-1069A	SHIELD PLATE D	1	
10	051F1JC-1072A	P-ADJUSTMENT PLATE	1	ADJ. PARTS
11	051F1JC-1076A	WIRE HOLDER	1	
12	056F1JC-1079A	WP SOCKET	1	
13	078F7JCSEP02A	DISK-IN SENSOR ASS'Y	1	
14	051F1JC-1084A	PULLEY WASHER	1	
15	078F7JCS1008A	CLAMP BASE PLATE ASS'Y	1	
16	078F7JCU1014A	CLAMPER ASS'Y	1	
17	078F7JCS1051A	HEAD CARRIAGE ASS'Y	1	
18	078F7JCSEP03A	FRONT LED ASS'Y	1	
19	056F1JC-1104A	P-WASHER	4	ADJ.PARTS
20	077F1JCSEP02A	W/P SENSOR ASS'Y	1	
21	077F1JCSEP01A	INDEX SENSOR ASS'Y	1	
22	051F1JCSEP04B	TRACK 00 SENSOR ASS'Y	1	
23	078F1JCSEP01A	CONTROL PCB ASS'Y	1	
24	051F1JCSW02A	8 PIN CONNECTOR HOUSING	1	
25	EJ0008-01MS	FASTEN TERMINAL	1	
26	078F5JC-EM01A	DD MOTOR ASS'Y	1	
27	078F5JC-EM02A	STEPPING MOTOR ASS'Y	1	
S-1	112-30714	SCREW 2 × 3	2	
S-2	SPNZ25-03042	SCREW 2.5 × 3	2	
S-3	SPNZ25-05042	SCREW 2.5 × 5	4	
S-4	SPNZ30-05042	SCREW 3 × 5	1	
S-5	SPNZ30-06042	SCREW 3 × 6	1	
S-6	SENB30-06042-3	SCREW 3 × 6 × 8 WS	3	
S-7	SENB30-08042-3	SCREW 3 × 8 × 8 WS	2	
S-8	SENB30-06042	SCREW 3 × 6 S	2	
S-9	SENA30-06042	SCREW 3 × 6 S	4	
S-10	SENF30-08Q42-3	SCREW 3 × 8 × 8 S	2	
S-11	SPSZ30-06042	SCREW 3 × 6	2	
S-12	SENF20-08042	SCREW 2 × 8 × 5 S	1	
S-13	SP3Z20-07042	SCREW 2 × 7	1	

Mechanism Exploded View of F-502LII (Rev.B)



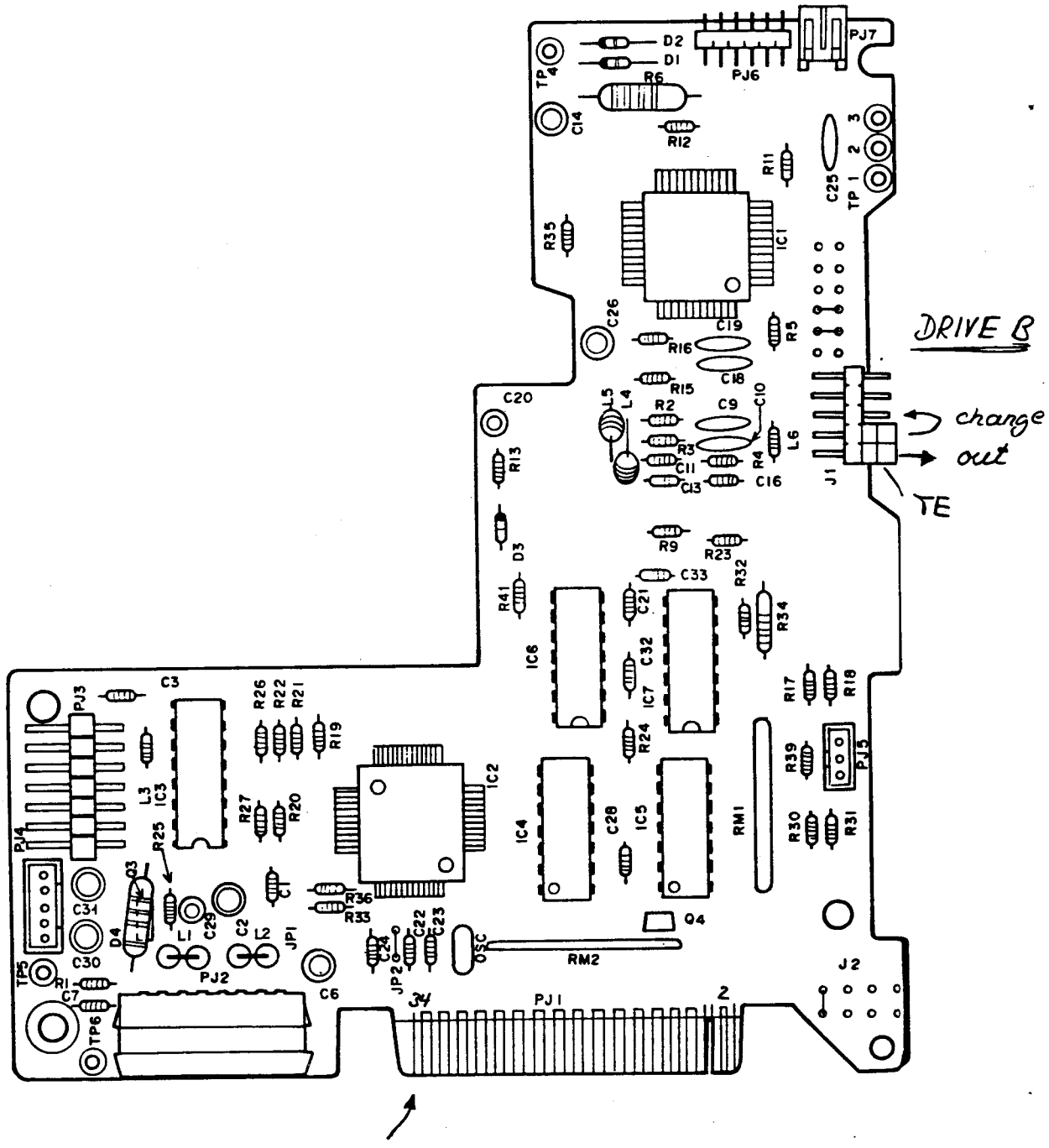
5-5. Electronical Parts List of Control PC Board Ass'y

The components of the control PC board ass'y are listed below.

PARTS NO.	DESCRIPTION	QTY	REMARKS
QCX20185	R/W IC. CX20185	1	IC1
QTC8600SF	IC. TC8600SF	1	IC2
QTD62003P	IC. TD62003P	1	IC3
EI74T38	IC. 7438	2	IC4, 5
Q74LS04	IC. 74LS04	2	IC6, 7
Q2SA950-X	TR. 2SA950	1	Q3
QRN1201-X	TR. RN1201	1	Q4
Q1S1588-X	DIODE 1S1588	2	D1, 2
Q1SS176-X	DIODE 1SS176	1	D3
QS5566B	DIODE S5566B	1	D4
O51F1JC-EZ04A	F-INDUCTOR BL02RN2-R62	2	L1, 2
O51F5JC-EL01A	INDUCTOR 100μH	1	L3
O80F1JC-EL02A	INDUCTOR 470μH	2	L4, 5
O68F1JC-EL01A	INDUCTOR 47μH	1	L6
CCK50B561KYJ-X	CAPACITOR 560PF/50V	1	C13
CCK50S300J-X	CAPACITOR 30PF/50V	2	C22, 23
CCXK25G223ZYJ-X	CAPACITOR 0.022μF/25V	5	C1, 3, 24, 28, 33
CCK50S101K-X	CAPACITOR 100PF/50V	1	C11
CCK16Y472MYJ-X	CAPACITOR 4700PF/16V	1	C21
O65F1JC-EZ10A	CERAMIC RESONATOR 4MHZ	1	OSC
CCK12S104MY-X	CAPACITOR 0.1μF/25V	1	C25
CCK16S473MY-X	CAPACITOR 0.047μF/16V	4	C9, 10, 18, 19
CCK16C103NYJ-X	CAPACITOR 0.01μF/16V	2	C7, 32
CCK16Y222MYJ-X	CAPACITOR 2200PF/16V	1	C16
CEX16C220M-X	CAPACITOR 22μF/16V	2	C2, 14
ECE0011C330-X	CAPACITOR 33μF/10V	2	C6, 26
ECE0011H3R3-X	CAPACITOR 3.3μF/50V	2	C20, 29
CEX25A100M-X	CAPACITOR 10μ/25V	2	C30, 31
RDNT181J-X	RESISTOR 1/6W 180Ω	2	R5, 35
RDNT221J-X	RESISTOR 1/6W 220Ω	2	R17, 20
RDNT391J-X	RESISTOR 1/6W 390Ω	3	R2, 3, 24

PARTS NO.	DESCRIPTION	QTY	REMARKS
RDNT471J-X	RESISTOR 1/6W 470Ω	1	R23
RDNT102J-X	RESISTOR 1/6W 1KΩ	5	R25, 26, 27, 32, 33
RDNT122J-X	RESISTOR 1/6W 1.2KΩ	1	R21
RDNT222J-X	RESISTOR 1/6W 2.2KΩ	2	R4, 41
RDNT392J-X	RESISTOR 1/6W 3.9KΩ	2	R9, 11
RDNT472J-X	RESISTOR 1/6W 4.7KΩ	1	R12
RDNT103J-X	RESISTOR 1/6W 10KΩ	6	R16, 19, 30, 31, 36, 39
RDNT303J-X	RESISTOR 1/6W 30KΩ	1	R15
RDNT473J-X	RESISTOR 1/6W 47KΩ	2	R18, 22
RDNT104J-X	RESISTOR 1/6W 100KΩ	2	R1, 13
RSEE131J	RESISTOR 1W 130Ω	1	R6
RDCT151J-X	RESISTOR 1/4W 150Ω	1	R34
056F1JC-EZ01A	R-PACK 150Ω X 8 1/8W	1	RM1
065F1JC-EZ09A	R-PACK 1KΩ X 5 1/8W	1	RM2
068F1JC-EJ08A	SHORT PLUG	2	J1
078F5JC-EJ01A	SHORT PIN 10PIN	1	J1
XF06C025	JUMPER WIRE	3	J1, J2
XF06C050	JUMPER WIRE	1	JP2
EJ0012A04MR	POWER CONNECTOR 4PIN	1	PJ2
EJ0020A	BAND	1	PJ2
068F1JC-EJ01A	2PIN CONNECTOR MALE (LED)	1	PJ7
078F5JC-EJ01A	4PIN CONNECTOR (DD MOTOR)	1	PJ4
068F1JC-EJ06A	3PIN CONNECTOR (DISK-IN)	1	PJ5
068F1JC-EJ02A	12PIN CONNECTOR (HEAD)	1	PJ6
068F1JC-EJ03A	14PIN CONNECTOR (SENSOR)	1	PJ3

PC-FDD CHINON F502-L (Double Density)



– MEMO –

TP1, TP2 } Differenzieller Ausgang (codiert) Alignment

TP 3 A. GND

TP 4 READ DATA } Asymmetry siehe 3.7.

TP 5 D. GND
TP 6 + INDEX SENSE } Speed - Messung 200 ± 3ms

TP 7 INDEX

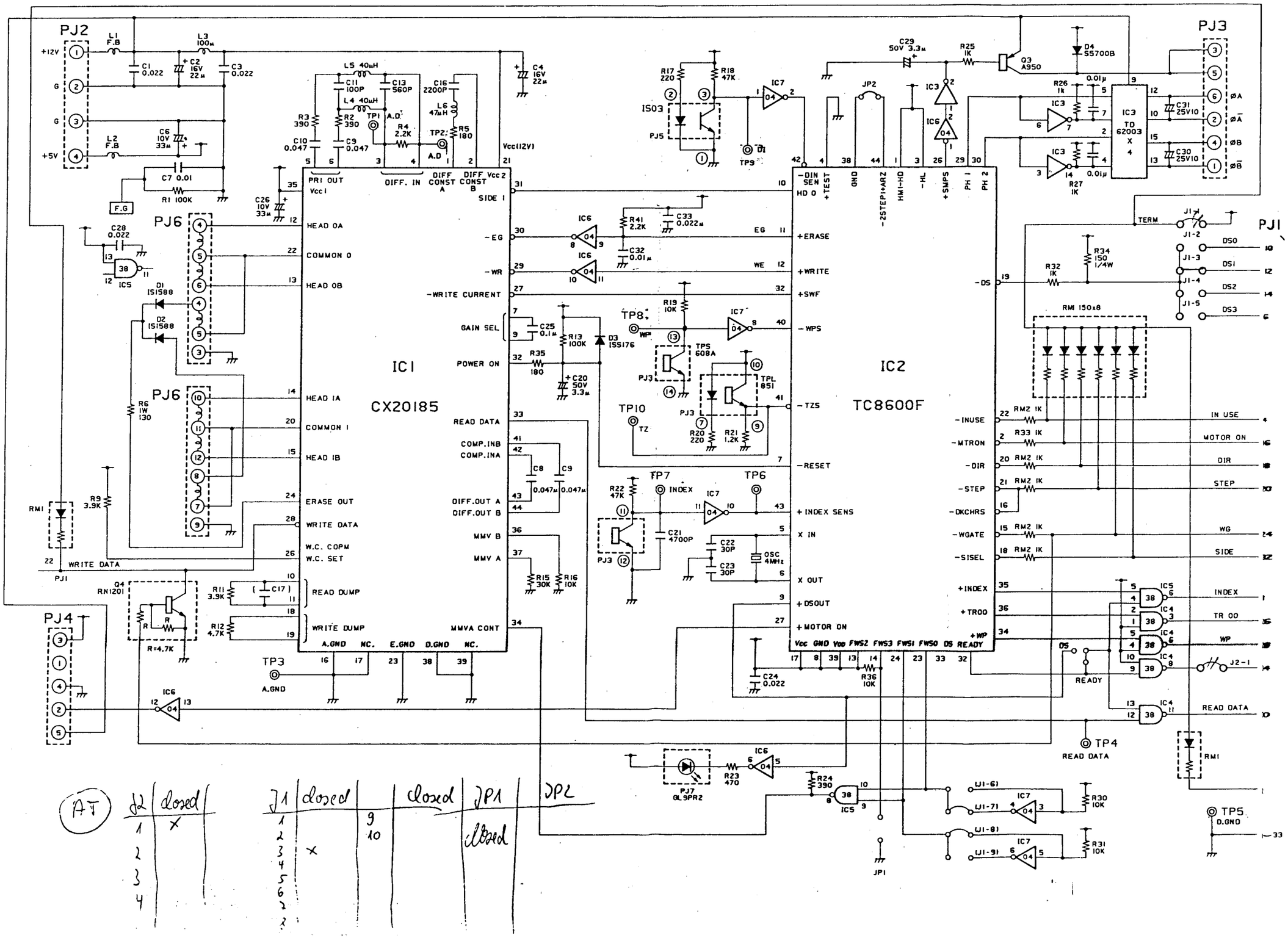
TP 8 WP - Write Protect Sensor

TP 9 DJ - Disk indicator (disk change) siehe 3.4.

TP 10 TZ - Track 00 sensor siehe 3.10

TP8 => nichts Dreieckgeschrieben LOW

5-6. Schematic Diagram for F-502II/F-502LII



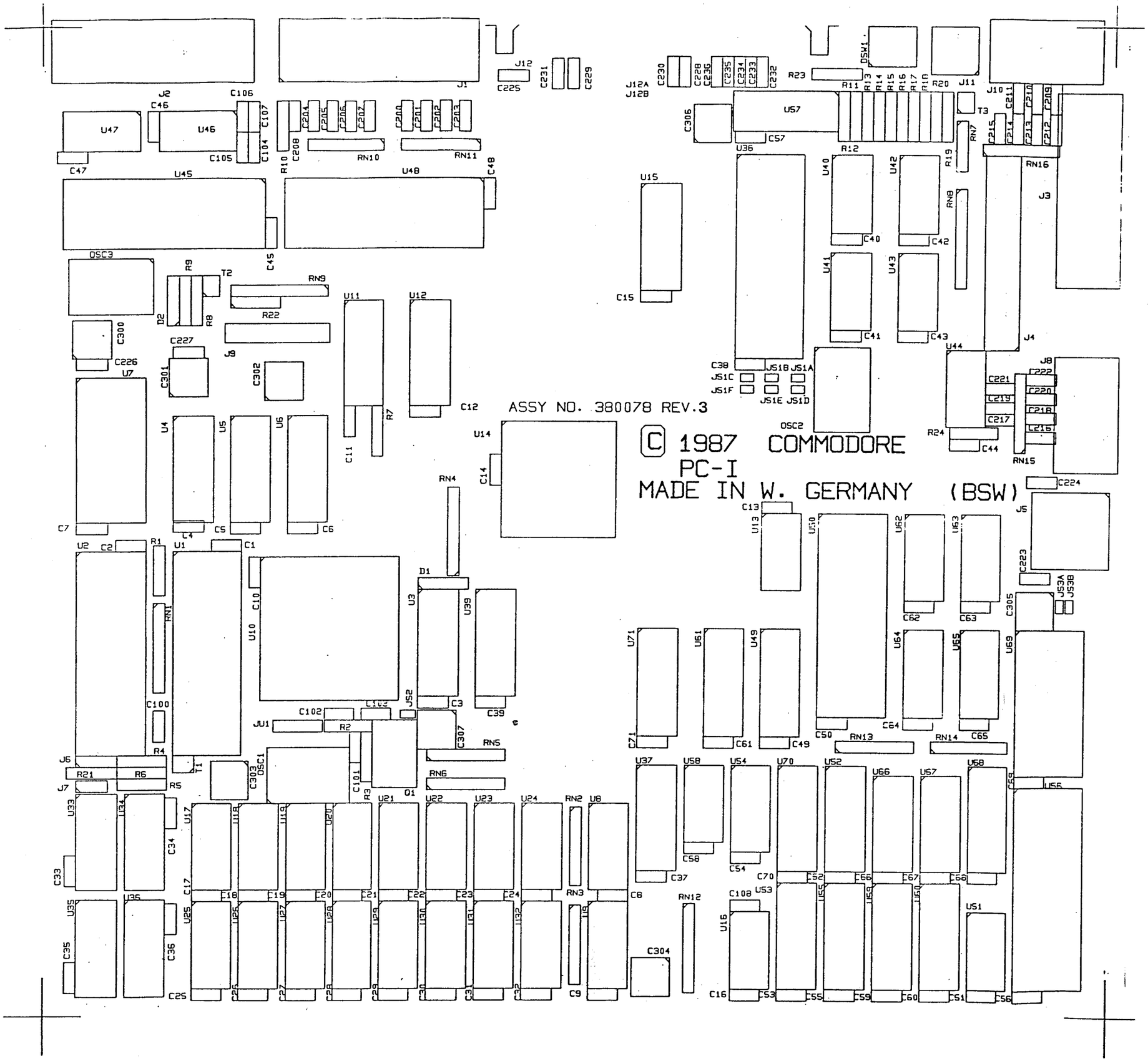
AT

J2	closed
1	X
2	
3	
4	

J1	closed		closed	JP1	JP2
1		9			
2		10		closed	
3	X				
4					
5					
6					
7					

3.
Keyboard
Service Manual

4.
Power Supply Schematic


ASSY NO. 380078 REV.3
© 1987 COMMODORE
PC-I
MADE IN W. GERMANY (BSW)
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JS1C
JS1D
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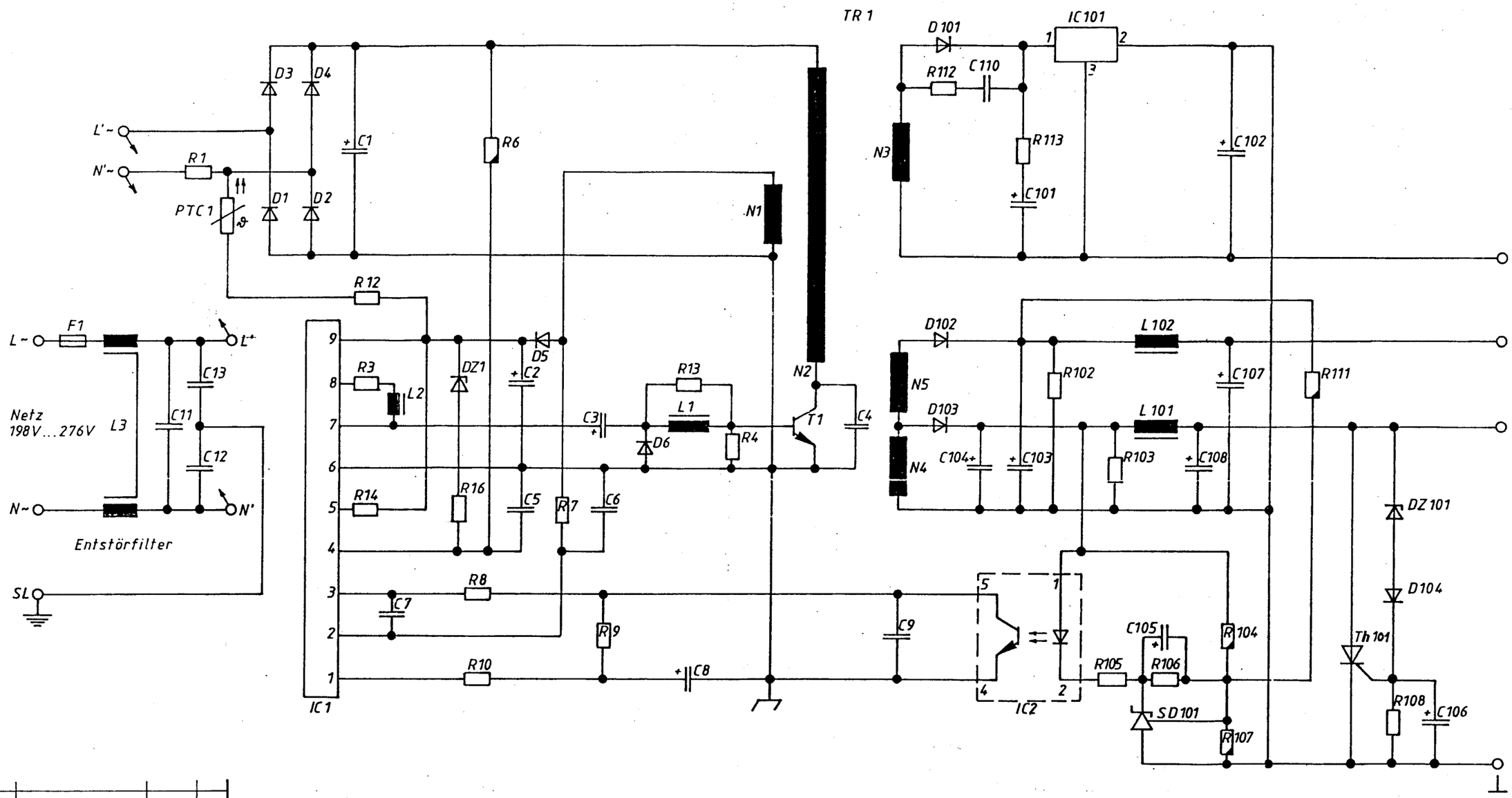
JS1F
JS2
JS3A
JS3B
OSC1
OSC2
OSC3
DSW1



Pos.	Änderung	Datum	Name

4-1

Layout 9-1390-476

Werkstoff	Oberfläche	Gezeichnet	13.8.87	'Br.
		Geprüft		
Maßstab	Stromlauf		BV 223-5-04014	

5.
Diagnostic
PC 1

1. DIAGNOSTIC

1.1 PRODUCTION-DIAGNOSTIC PC1

1.2 BURN-IN PC1

1.3 SYSTEM-DIAGNOSTIC PC1

1.1 PRODUCTION-DIAGNOSTIC

These DIAGNOSTIC checks following subsystems of PC1:

1.1.1 LSI Chips
1.1.2 Memory Section
1.1.3 Keyboard Connector
1.1.4 Disk-drive Interface
1.1.5 Parallel Interface
1.1.6 Serial Interface
1.1.7 Mouse Interface
1.1.8 Expansion Slot
1.1.9 Video Section

For testing printer, acia and mouse ports two jumpers are required.

- jumper for printer and mouse port :

  P 1 - P13
  P 2 - P15
  P10 - P16
  P11 - P17
  P12 - P14
  P 3 - M3
  P 4 - M4
  P 5 - M5
  P 6 - M6
  P 7 - M9
  P 8 - M1
  P 9 - M2

- jumper for acia port :

  1 - 7
  2 - 3
  4 - 5 - 8
  6 - 20

Preparation of test:

- PC1 in standard configuration
- Insert DIAGNOSTIC disk into drive A (5.25")
- Insert DIAGNOSTIC disk into drive B (3.5")
- Hook up jumper on printer, acia and mouse port
- Connect monitor (MultiSync)
- Switch on

All test results will be displayed in the following format:

test code, version, subsystem, test result, (error status)

An error status will only be displayed when an error occured. It will be headed by the error code of the faulty component (as in the diagnostic test) and will then give the essential status of the subsystem under test, as specified in the following list. So the error status can be noted as a short message for further analysis.

Testroutines for Production-Diagnostic :

1.1.1 LSI Chips

- CPU
  has been done during power-up

- FE2010
  has been done during power-up

- MIO
  check different printer base offsets
  check different acia base offsets
  check different mouse modes (on,off)

- Math-Co-Processor
  PC1 comes without 8087

1.1.2 Memory Section

- Address bus test
- Check memory refresh logic
- Extended memory R/W test

1.1.3 Keyboard Interface

- Check keyboard reset function
- Check correct scancode transfer

1.1.4 Disk-drive Interface

For testing disk drive interface a 3.5"-Floppy drive (A1010) and special formatted disks are required.

- Reset disk system
- Linear and random seek test
- Read test (prepared disks required)
- Write/Verify test (formatted disks required)

1.1.5 Parallel Interface

For testing printer port special jumper is required.

- R/W test of printer data register
- Check handshake lines
- Check printer interrupt

1.1.6 Serial Interface

For testing acia port special jumper is required.

- Check acia lines at 1200Bd and 9600Bd
- Check handshake lines
- Check acia interrupt

1.1.7 Mouse Interface

For testing mouse port special jumper is required.

- Check mouse lines with printer port lines connected to mouse port

1.1.8 Expansion Slot

For testing expansion slot special HW (PC1 Expansion Dummy) is required.

- Check address and data bus lines
- Check status and control lines

1.1.9 Video Section

For test video section two B/W monitors (RGBI-, Comp.-input) and one COLOR monitor (RGBI-input) are required.

- Video memory R/W test
- Test pictures for monochrome mode:
  - Attributes
  - Character set (80x25)
  - Square boxes (Hercules)
- Test pictures for color modes:
  - Attributes 40 Col/Line
  - Attributes 80 Col/Line
  - Page 0,2,5,7
  - 320x200 16 Colors
  - 640x200 1st Color set
  - 640x200 2nd Color set
  - 640x200 B/W

```
 Diskette/Platte, Laufwerk A:, hat den
 Namen T-PC1
Verzeichnis von A:Ö

COMMAND  COM     23612   7.07.86  12.00
T-RAM640 COM       552   7.08.87  14.23
T-RAM512 COM       552  12.08.87  18.16
T-KEYB   COM       376   7.08.87  14.24
T-FDC    COM      2376   7.08.87  14.23
DEBUG    EXE     15647   7.07.86  12.00
AUTOEXEC BAT       169  16.09.87  15.45
DISKCOPY EXE      4096   7.07.86  12.00
T-PR     COM       548  15.09.87  12.33
T-ACIA   COM      1326  15.09.87  12.33
T-MIO    COM       686  16.09.87  17.11
T-MOUSE  COM       788  16.09.87  17.12
T-MONO   EXE     42850  15.09.87  14.28
T-COLOR  EXE     42818  15.09.87  15.03
DIAG     DOC       332  16.09.87  17.54
PC1DIAG  DOC      6138  12.08.87  16.20
       16 Datei(en)     166912 Byte frei
```

6.
Ersatzteil
Liste

PART NO.	DESCRIPTION
380078 – 01	PCB ASSY., PC – I, SLOW VERSION
380078 – 02	PCB ASSY., PC – I, FAST VERSION

REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
1		ENGINEERING RELEASE		
2		ENGINEERING RELEASE		
3		ENGINEERING RELEASE		
4		ENGINEERING RELEASE		
5		ENGINEERING RELEASE		
6		PILOT PRODUCTION RELEASE		
7		REVISED/REDRAWN PER ECO 870324		
A		REVISED PER ECO 870241		
B		REVISED PER ECO 870462	2/19/88	R-Rucka

SHEET 6 OF 6 SIZE B

ASSY DWG

NOTES:

C.A.D. GENERATED

NO MANUAL CHANGES TO BE MADE TO THIS DOCUMENT.

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commodore

TITLE: PCB ASSY., PC – I

DRAWN BY: C. SANTILLANA

CHKD:

DATE: 9-21-87

ENGR:

APPR:

SIZE: B

DRAWING NUMBER: 380078

SHEET 1 OF 6

QUANTITY REQD PER PART/DASH NO. -02	QUANTITY REQD PER PART/DASH NO. -01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
		1		380150 – 01	SCHEMATIC			
		2		380151 – 01	PCB ARTWORK			
1	1	3		380152 – 01	FABRICATION, PCB			
		4						
1	1	5		380811 –04	GROUND CABLE ASSY., MOUSE CONN.	J8		
1	1	6		380267 – 01	IC, PPC 1 PARALLEL	U48		VENDOR: PARADISE
1	1	7		380268 – 01	IC, PVC 2 VIDEO	U56		VENDOR: PARADISE
		8						
0	1	9		380786 – 01	IC, FE2010	U10		VENDOR: FARADAY
1	0	10		380786 – 02	IC, FE2010A	U10		VENDOR: FARADAY
		11						
1	1	12		318087 – 01	IC, 5720 MIO, I/O DECODER	U14		VENDOR: MOS, 68 PIN PLCC
		13						
1	1	14		312710 –01	IC, SMC9268	U38		VENDOR: SMC
1	1	15		380208 – 02	IC, MC6845P	U50		VENDOR: MOTOROLA
0	0	16		380201 – 01	IC, 8087	U2		OPTIONAL
		17						
0	1	18		380200 – 01	IC, 8088, 5 MHz	U1		
1	0	19		380200 – 02	IC, 8088, 10MHz	U1		
2	2	20		325244 –01	HEATSINK, IC	U1, U38		
		21						
1	0	22		380278 – 01	IC, PAL, V (10 MHz)	U39		PROD OF 16L8 B
0	1	23		380278 – 02	IC, PAL, V (5 MHz)	U39		PROD OF 12L6
1	1	24		380205 – 01	IC, 8250	U45		
1	1	25		380274 – 01	IC, PAL I	U53		PROD OF 16L8 P/N: 380219 – 01
1	1	26		380275 – 01	IC, PAL II	U55		PROD OF 16L8 P/N: 380219 – 01
1	1	27		380276 – 01	IC, PAL III	U59		PROD OF 16L8 P/N: 380219 – 01
1	1	28		380277 – 01	IC, PAL IV	U60		PROD OF 16L8 P/N: 380219 – 01
		29						
		30						
0	16	31		380223 – 01	IC, DRAM 256 x 1, 150 ns	U17–U32		
16	0	32		380278 – 02	IC, DRAM 256K x 1, 120 ns	U17–U32		
2	2	33		380256 – 01	IC, DRAM 64K x 4, 150 ns	U66,U67		
		34						
		35						

commodore	TITLE : PCB ASSY., PC – 1	DRAWN BY : C. SANTILLANA	DATE 9–22–87	ENGR :	DATE	SIZE B	DRAWING NUMBER 380078	REV E
		CHKD :		APPR :			SHEET 2 OF 6	

QUANTITY REQD PER PART/DASH NO. -02	QUANTITY REQD PER PART/DASH NO. -01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
0	1	36		380270 – 01	IC, 23128 ROM, BIOS, 250 ns	U7		VENDOR: MOS
1	1	37		380271 – 01	IC, 23128 ROM, CHARACTER, 200 ns	U69		VENDOR: MOS
0	S	38		380270 – 01	IC, EPROM 27128, 250 ns, BIOS	U7		SUBSTITUTE FOR ITEM 36, PROD. OF 324746 – 03
S	S	39		380271 – 01	IC, EPROM 27128, 200 ns, CHARACTER	U69		SUBSTITUTE FOR ITEM 37, PROD. OF 324746 – 04
S	S	40		380271 – 02	IC, EPROM 2764, 200 ns, CHARACTER INT	U69		SUBSTITUTE FOR ITEM 37, PROD. OF 324489 – 02
S	S	41		380271 – 03	IC, EPROM 2764, 200 ns, CHARACTER SCAN	U69		SUBSTITUTE FOR ITEM 37, PROD. OF 324489 – 02
1	0	42		380270 – 02	IC, 23128 ROM, BIOS, 150 ns	U7		
S	0	43		380270 – 02	IC, EPROM 27128, BIOS, 150 ns	U7		SUBSTITUTE FOR ITEM 40, PROD. OF 324746 – 04
1	1	44		901882 – 01	IC, MC1488	U47		
1	1	45		901883 – 01	IC, MC1489	U46		
2	2	46		901522 – 06	IC, 7406	U43,U44		
2	2	47		901521 – 01	IC, 74LS00	U16,U58		
1	1	48		901521 – 02	IC, 74LS04	U13		
1	1	49		901521 – 03	IC, 74LS08	U40		
1	1	50		901521 – 30	IC, 74LS14	U42		
1	1	51		901521 – 06	IC, 74LS74	U51		
		52						
0	2	53		901521 – 87	IC, 74LS158	U8,U9		
		54						
		55						
5	5	56		901521 – 13	IC, 74LS244	U11,U12, →		→ U57,U61,U70
2	4	57		901521 – 46	IC, 74LS245	U3,U15, →		→ U37,U49
5	5	58		901521 – 57	IC, 74LS257	U54,U62, →		→ U63–U65
1	1	59		901521 – 42	IC, 74LS273	U68		
3	3	60		901521 – 29	IC, 74LS373	U4–U6		
1	1	61		901521 – 43	IC, 74LS374	U52		
1	1	62		901525 – 04	IC, 74S00	U41		
		63						
		64						
2	0	65		252208 – 01	IC, 74F245	U3,U37		
2	0	66		390092 – 08	IC, 74F158	U8,U9		
		67						
1	0	68		325566 – 14	OSCILLATOR, 28.636 MHz	OSC1		
0	1	69		900558 – 01	QUARTZ, 14.31818 MHz	Q1		HC–18/U HOUSING
1	1	70		380312 – 01	OSCILLATOR, 1.8432 MHz	OSC3		

commodore	TITLE : PCB ASSY., PC – 1	DRAWN BY : C. SANTILLANA	DATE 9–22–87	ENGR :	DATE	SIZE B	DRAWING NUMBER 380078 SHEET 3 OF 6	REV B
		CHKD :		APPR :				

QUANTITY REQD PER PART/DASH NO. -02	-01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
1	1	71		325566 – 01	OSCILLATOR, 16 MHz	OSC2		
		72						
2	2	73		900850 – 01	DIODE, 1N4148	D1,D2		
1	1	74		324219 – 01	TRANSISTOR, BC327–B	T1		
1	1	75		324220 – 01	TRANSISTOR, NPN, BC337–16	T2		
1	1	76		902650 – 01	TRANSISTOR, 2N3904, NPN	T3		
		77						
		78						
4	4	79		904150 – 07	SOCKET, IC	U33–U36		18 PIN DIP
2	2	80		904150 – 05	SOCKET, IC	U7,U69		28 PIN DIP
3	3	81		904150 – 06	SOCKET, IC	U1,U2,U56		40 PIN DIP
1	1	82		390185 – 02	SOCKET, IC	U14		68 PIN PLCC
1	1	83		390185 – 01	SOCKET IC	U10		84 PIN PLCC
		84						
		85						
1	1	86		902417 – 03	RESISTOR NETWORK, 1K OHM X 4	RN7		SINGLE LINE, 5 PIN, SP: 2.54 MM
1	1	87		902442 – 40	RESISTOR NETWORK, 27K OHM x 7	RN15		SINGLE LINE, 8 PIN, SP: 2.54 MM
2	2	88		902412 – 05	RESISTOR NETWORK, 4.7K OHM x 8	RN1,RN4		SINGLE LINE, 9 PIN, SP: 2.54 MM
2	2	89		902410 – 08	RESISTOR NETWORK, 4.7K OHM x 9	RN8,RN9		SINGLE LINE, 10 PIN, SP: 2.54 MM
9	9	90		902422 – 03	RESISTOR NETWORK, 33 OHM x 4	RN2,RN3, →		→ RN5,RN6,RN10,RN11, RN13, RN14, RN16
		91						SINGLE LINE, 8 PIN, SP: 2.54 MM
1	1	92		902412 – 04	RESISTOR NETWORK, 2.2K OHM x 8	RN12		SINGLE LINE, 9 PIN, SP: 2.54 MM
1	1	93		903781 – 01	WIRE JUMPER	R22		
S	S	94			RESISTOR PTC 1R5	R22		SUBSTITUTE FOR ITEM 93
1	1	95		901550 – 126	RESISTOR, CARBON FILM, 20 OHM, .25 WATT, 5%	R20		
4	4	96		901550 – 105	RESISTOR, CARBON FILM, 33 OHM, .25 WATT, 5%	R6,R7,R10, →		→ R23.
1	1	97		901550 – 45	RESISTOR, CARBON FILM, 75 OHM, .25 WATT, 5%	R19		
0	1	98		901550 – 49	RESISTOR, CARBON FILM, 100 OHM, .25 WATT, 5%	R2		
1	1	99		901550 – 134	RESISTOR, CARBON FILM, 130 OHM, .25 WATT, 5%	R12		
1	1	100		901550 – 52	RESISTOR, CARBON FILM, 220 OHM, .25 WATT, 5%	R21		
1	1	101		901550 – 108	RESISTOR, CARBON FILM, 360 OHM, .25 WATT, 5%	R11		
2	2	102		901550 – 31	RESISTOR, CARBON FILM, 680 OHM, .25 WATT, 5%	R13,R18		
1	1	103		901550 – 88	RESISTOR, CARBON FILM, 750 OHM, .25 WATT, 5%	R14		
3	3	104		901550 – 01	RESISTOR, CARBON FILM, 1K OHM, .25 WATT, 5%	R5,R17,R24		
1	1	105		901550 – 53	RESISTOR, CARBON FILM, 2K OHM, .25 WATT, 5%	R15		

commodore

TITLE : PCB ASSY., PC – 1

DRAWN BY :	DATE	ENGR :	DATE	SIZE	DRAWING NUMBER	REV
C. SANTILLANA	9-22-87			B	380078	B
CHKD :		APPR :			SHEET 4 OF 6	

QUANTITY REQD PER PART/DASH NO. -02	-01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
		106						
1	1	107		901550 – 33	RESISTOR, CARBON FILM, 3K OHM, .25 WATT, 5%	R16		
2	2	108		901550 – 19	RESISTOR, CARBON FILM, 4.7K OHM, .25 WATT, 5%	R4,R9		
2	2	109		901550 – 20	RESISTOR, CARBON FILM, 10K OHM, .25 WATT, 5%	R1,R8		
0	1	110		901550 – 84	RESISTOR, CARBON FILM, 1M OHM, .25 WATT, 5%	R3		
		111						
		112						
9	9	113		324204 – 03	CAPACITOR, CERAMIC, RADIAL, 2.2 nF	C200–C208		SP: 5 MM +/– 10%
7	7	114		324204 – 09	CAPACITOR, CERAMIC, RADIAL, 10 nF	C216–C222		SP: 5 MM +/– 10%
		115						
0	1	116		251070 – 16	CAPACITOR, CERAMIC, RADIAL, 33 pF, 50 V	C101		
8	8	117		251070 – 18	CAPACITOR, CERAMIC, RADIAL, 47 pF, 50 V	C108		
		118				C209–C215		SP: 5 MM +/– 10%
4	4	119		251069 – 02	CAPACITOR, CERAMIC, RADIAL, 330 pF	C104–C107		
4	4	120		251071 – 30	CAPACITOR, CERAMIC, RADIAL, 470 pF, 50 V	C100,C102,		
		121				C103,C223		SP: 5 MM +/– 10%
43	43	122		324204 – 10	CAPACITOR, CERAMIC, RADIAL, .22 uF	C1,C2,C7,C10 → C14,C17–C36,C38,C39,C45,C50,C53,C55,C56,C59		
		123				C60,C66, → C67,C69,C70,C224–C227		
		124						
32	32	125		900020 – 01	CAPACITOR, CERAMIC, RADIAL, .1 uF	C3–C6,C8 → C9,C11–C13,C15,C16,C37,C40–C44,C46,C47,C49		
		126				C51,C52, → C54,C57,C58,C61–C65,C68,C71		
		127						
8	8	128		900100 – 27	CAPACITOR, ELECTROLYTIC, RADIAL, 47 uF, 16V	C300–C307		–10/+50%
		129						
1	1	130		904775 – 01	DIP SWITCH 4 x 1, 90	DSW1		
		131						
		132						
1	1	133		903326 – 03	HEADER ASSY., SINGLE ROW, .100 CTR.	J7		3 PIN/LED
1	1	134		903326 – 04	HEADER ASSY., SINGLE ROW, .100 CTR.	J6		4 PIN/SPEAKER–RESET, REMOVE PIN 3
1	1	135		327032 – 01	CONNECTOR, 9 PIN, SUB MINI "D" MALE	J8		
S	S	136		390242 – 02	CONNECTOR, 9 PIN, SUB MINI "D" MALE	J8		SUBSTITUTE FOR ITEM 135
1	1	137		327033 – 01	CONNECTOR, 9 PIN, SUB MINI "D", FEMALE	J10		
S	S	138		390241 – 02	CONNECTOR, 9 PIN, SUB MINI "D", FEMALE	J10		SUBSTITUTE FOR ITEM 137
1	1	139		327033 – 03	CONNECTOR, 23 PIN, SUB MINI "D" FEMALE	J3		
S	S	140		390241 – 04	CONNECTOR, 23 PIN, SUB MINI "D" FEMALE	J3		SUBSTITUTE FOR ITEM 139

commodore

TITLE : PCB ASSY., PC – 1

DRAWN BY :	DATE	ENGR :	DATE	SIZE	DRAWING NUMBER	REV
C. SANTILLANA	9-22-87			B	380078	B
CHKD :		APPR :			SHEET 5 OF 6	

QUANTITY REQD PER PART/DASH NO. -02	QUANTITY REQD PER PART/DASH NO. -01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
1	1	141		327032 – 05	CONNECTOR, 25 PIN, SUB MINI "D" MALE	J2		
S	S	142		390242 – 06	CONNECTOR, 25 PIN, SUB MINI "D" MALE	J2		SUBSTITUTE FOR ITEM 141
1	1	143		327033 – 05	CONNECTOR, 25 PIN, SUB MINI "D" FEMALE	J1		
S	S	144		390241 – 06	CONNECTOR, 25 PIN, SUB MINI "D" FEMALE	J1		SUBSTITUTE FOR ITEM 143
1	1	145		252122 – 01	RCA PHONE JACK	J11		
1	1	146		380722 – 01	CONNECTOR, 5 PIN DIN FEMALE	J5		
S	S	147		903362 – 01	CONNECTOR, 5 PIN DIN FEMALE	J5		SUBSTITUTE FOR ITEM 146
1	0	148		903781 – 01	WIRE JUMPER	JU1		
1	1	149		903345 – 17	HEADER ASSY. DUAL ROW, .1 CENTER	J4		34 PIN FLOPPY, REMOVE PIN 3
1	1	150		903328 – 07	HEADER ASSY., FRICTION LOCK, .156 CENTER	J9		7 PIN POWER, REMOVE PIN 3
		151						
		152						
		153						
		154						
		155						
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commodore

TITLE : PCB ASSY., PC – 1

DRAWN BY :	DATE	ENGR :	DATE	SIZE	DRAWING NUMBER	REV
C. SANTILLANA	9-22-87			B	380078	B
CHKD :		APPR :			SHEET 6 OF 6	

PART NO.	DESCRIPTION	
380 083 - 01	MAIN ASSY PC - I	VDE | BSI
- 02		UL
380 083 - 03	MAIN ASSY PC - I	CSA

REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
1		ENGINEERING RELEASE	07-01-87	

1. SHEET OF SIZE

ASSY DWG

NOTES:

commodore	TITLE: MAIN ASSY , PC - I	DRAWN BY:	DATE 07-01-87	ENGR:	7-04-87	SIZE B	DRAWING NUMBER 380 083
		CHKD:		APPR:			SHEET 1 OF 3

1715 Gebr. Wichmann

QUANTITY REQD PER PART / DASH NO. 03	02	01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
1	1	1	01		380 078 - 01	PCB-ASSY-MAINBOARD			
			02						
		1	03		380 081 - 01	POWER-SUPPLY-ASSY, VDE/BSI			
1	1		04		380 081 - 02	POWER SUPPLY ASSY, UL/CSA			
1	1	1	05		311 308 - 01	POWER-LED-ASSY, RED			
			06						
1	1	1	07		380 012 - 09	DRIVE-CABLE-ASSY (34-PIN, L=190MM)			
			08						
1	1	1	09		380 148 - 01	TOP CASE			
			10						
1	1	1	11		380 149 - 01	BOTTOM CASE			
			12						
1	1	1	13		380 154 - 01	EXPANSION DOOR (FOR BOTTOM CASE)			
			14						
1	1	1	15		380 165 - 01	PAPER SHIELD			
			16						
4	4	4	17		950 150 - 03	RUBBER FEET			
			18						
1	1	1	19		380 146 - 01	NAME PLATE			
			20						
1	1	1	21		380 111 -01	FLOPPY DRIVE 5.25"			
1	1	1	22		380 656 - 01	COVER, FLOPPY DRIVE			
2	2	2	23		380 153 - 01	FLOPPY HOLDER (PLASTIC)			
4	4	4	24		906 800 - 03	SCREW PN.HD. M3×8MM			
3	3	3	25		906 883 - 04	SCREW, S.T. 2.9x9.5MM			
			26						
		1	27		380 421 - 35	LABEL, RATING VDE/BSI			
	1		28		380 421 - 33	LABEL, RATING UL			
1			29		380 421 - 34	LABEL, RATING CSA			
			30						
			31						
1	1	1	32		380 811 - 03	GROUND CABLE ASSY, DISK DRIVE (L=60MM)			
			33						
			34						
1	1	1	35		325090- 02	STICKER, SEAL			
			36						
2	2	2	37		325244-01	HEATSINK, IC			

commodore

TITLE: MAIN ASSY, PC-I

DRWN BY:	DATE	ENGR:	DATE	SIZE		REV	SHT
li	7-1-87	li	7-1-87	B	380 083	1	2/3
CHKD:		APPR:					

1715 Gebr. Wiemann

PART NO.	DESCRIPTION	
380 081 - 01	POWER SUPPLY ASSY , PC - I	VDE / BSI
- 02	POWER SUPPLY ASSY , PC - I	UL / CSA

REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
1		ENGINEERING RELEASE	08/24/87	

1. SHEET OF SIZE

ASSY DWG

NOTES:

commodore	TITLE: POWER SUPPLY ASSY, PC - I	DRAWN BY: GM.	DATE 08/24/87	ENGR:		SIZE B	DRAWING NUMBER 380 081	
		CHKD:		APPR:			SHEET 1 OF 3	

1715 Gebr. Wichmann

QUANTITY REQD PER PART / DASH NO. 02	QUANTITY REQD PER PART / DASH NO. 01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
	1	01		380 079 - 01	PCB-ASSY, POWER SUPPLY VDE/BSI			WITH CABLE
1		02		380 079 - 02	PCB-ASSY, POWER SUPPLY UL/CSA			" "
		03						
1	1	04		380 155 - 01	BOTTOM CASE, PSU PC-I			
		05						
1	1	06		380 156 - 01	TOP CASE, PSU PC-I			
		07						
1	1	08		380 164 - 01	ISOLATOR			PERTINAX
		09						
2	2	10		906 800 - 01	SCREW M3 x 5 MM			FOR PCB
		11						
		12						
		13						
		14						
		15						
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commodore

TITLE: POWER SUPPLY ASSY, PC-I

DRWN BY: Gn.	DATE 08/24/87	ENGR:	DATE	SIZE	380081	REV 1
CHKD:		APPR:				

1715

PART NO.	DESCRIPTION
311 308 -01	LED ASSY (RED)

REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	3-25-85	

1. SHEET 1 OF 3 SIZE B
ASSY DWG
NOTES:

commodore	TITLE: LED ASSY (RED)	DRAWN BY: lu	DATE 3-25-85	ENGR:		SIZE B	DRAWING NUMBER 311308	
		CHKD:		APPR:			SHEET 1 OF 3	

1715 Gebr. Wichmann

QUANTITY REQD PER PART / DASH NO. 01	ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
	1						
1	2		252 018 - 01	LED RED			
	3						
1	4		903 756 - 10	WIRE, INSULATED, 24 AWG, BLACK, L= 70MM			
	5						
1	6		903 756 - 10	WIRE, BLACK, 24 AWG L=160MM			ONE SIDE INSULATED
1	7		903 756 - 02	WIRE, RED, 24 AWG L=160MM			ONE SIDE INSULATED
	8						
1	9		903 321 - 03	CONNECTOR, CLOSED END, .100 CENTER, 3 PIN			RM : 2.54 MM
	10						
4	11		905 475 - 03	HEAT - SHRINK TUBE			
	12						
	13						
	14						
	15						

commodore

TITLE: LED ASSY (RED)

DRWN BY:	DATE	ENGR:	DATE	SIZE		REV	SHT
li	3-25-85			B	311 308	A	2/3
CHKD:		APPR:					

1715 Gebr. Wichmann